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# OUR FARMING

How We Have Made a Run-down Farm
Bring Both Profit
and Pleasure

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Prof. E.J.Wickson

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T. B. Terry

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# Our Farming:

or,

## How We Have Made a Run-Down Farm Bring Both Profit and Pleasure.

Potato, Wheat and Clover Culture, Tile Drainage, Manure Saving, etc., etc.,
Treated Independently from
A to Z.

BY T. B. TERRY.

Published by
THE FARMER COMPANY,
Philadelphia
1893

B. Terry

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CALIFORNIA

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# Publishers' Preface.

The widespread popularity of Mr. Terry's articles, first published in a few of the leading agricultural journals, and for the last year or more exclusively in the columns of *The Practical Farmer*, has caused a demand for something that would give his experiences, methods and results in a more connected form, and without the repetition that must necessarily be found in a series of articles extending over many years, and having only the one subject with which to deal, however varied the subdivisions of that subject might be. This increasing demand led the publishers to communicate with Mr. Terry on the matter, and obtain his consent to give, in a connected form, his whole experience in farm life and work. The result is "Our Farming."

It gives us pleasure to be able to put such a work in the hands of the farmers of America for several reasons: It will disabuse the minds of some of the idea that the author has achieved his success through favorable conditions at the start. His methods are so clearly told that the truth of the results obtained from them is firmly established. A connected history of his farming will lead others, especially young farmers, to practise better methods and achieve a larger measure of success.

If it shall succeed in making farmers more proud of their profession and more satisfied with its practice, we feel we shall be justified in giving this book to the public.

THE FARMER CO.,
Publishers of *The Practical Farmer*,
Philadelphia.

526696

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# Introductory.

## By the Author.

We do not write this little book about OUR FARMING with any desire to brag or tell what we have done, in a boastful way. In fact, we have not done anything wonderful. It was thought best that it should be written in the first person largely,—that is, that we should tell just what we had done, that it should be a connected history of our farming. Quite likely the writer will, however, branch off into preaching a little now and then. A tendency this way was inherited, and a man who has found a good thing naturally likes to exhort others to try the same path. The Author has been writing more or less for the leading agricultural weeklies for the last ten years. He began with *The Country Gentleman* ten years ago last fall. *The Ohio Farmer* introduced him to its readers soon after, and then followed *The N. Y. Weekly Tribune*, *Rural New Yorker*, *Practical Farmer*, *Farm Journal* and *The National Stockman*. At present all his time is devoted to writing for *The Practical Farmer*. During these ten years, of course, there is hardly any part of his farming that has not been written about. The substance of this book can be found scattered through the thousand articles or more that have been written for the press, but in this book they will be found in a more convenient form for reference and with the latest improvements in every line. Agriculture does not stand still. We are learning and advancing every year. In these pages you will find the best I know now. Undoubtedly within five years I would like to change some things. But if I waited five years before writing this, the same would be true then. I shall try extremely hard not to say anything in this work that will mislead, and to make every little matter as plain as possible. To some it may seem unnecessarily simple and full on every little point. They must remember that there are thousands not so well posted as they are, and these are the ones who need help. It may interest you to know how much care a writer takes to have his articles just right. Every letter that goes from the author's pen is carefully read over twice. The first reading is to see if everything is exactly true. This may seem curious to you. Do you ever write anything that is not true, you may ask? Not intentionally, but I am full of enthusiasm for my calling, and when a little excited over a subject might paint a picture a little too brightly. I would be more than human if I did not. But after an article is written it is laid away for some days. Then it is taken up in cool blood and toned down, if necessary. My friend, A. I. Root, when visiting here, once said to me in regard to an article written in answer to an attack in the papers: "I don't see how you could reply so quietly to that uncalled-for attack." Well, I had rewritten the answer *three* times, each time toning it down. There was altogether too much of the old Adam in the first answer written.

At the second reading I say to myself, Now everything in this article is strictly true, but is there anything that will be misleading? Is part of the truth unconsciously withheld, or will anyone be likely to draw a wrong conclusion? Is every point so simple and plain that there will be no excuse for the ordinary reader if he does not fully understand? At this reading a pencil goes through any long or unusual words if there is a simpler one that will do as well. By this time the manuscript is often so much corrected that I rewrite it all, or perhaps some pages. For years I rewrote *every* article that went from my desk. Now do you think I am done? No. After all this the article goes to my wife, if I am at home, and she reads it and tells me if there is any point that is not perfectly plain to her, or anything she thinks had better be left out. To her excellent judgment I owe much. Every chapter of this book will go through this entire process, and we hope will be so revised that only good and no harm may be done.

But with all our care, readers must use their own judgment. In telling of our farming, we are not laying out a path for others to blindly follow. We would not encourage anyone to go into potato growing, for example, although much of this work is devoted to that subject. If you do grow potatoes, however, we would like to induce you to do your very best at it. If you do not, we would like to so enthuse you that you will push your particular line to the very highest point that is practical. The success of a man in a different line from what you follow may be excellent reading for you in the way of inspiration. It will be the one great aim of this book, all through, to encourage, enthuse and inspire. We have heard too much on the discouraging side, late years. True, there are some wrongs outside of the farm that ought to be righted, and little by little they will be, if we do not neglect our duty in this line. But during these years of depression in agriculture the writer has made money as fast or faster than he could in any other business on the same capital, and so have many farmers here and there. There is very much that most of us can do towards helping ourselves out of hard times, as I hope you will see from the following chapters.

It has been thought best for convenience of reference to treat the leading subjects, such as Potato Culture, Tillage, Clover, Tile Draining, etc., etc., each one alone by itself. Thus one will not have to look all through the book to find what he wants to know on any particular subject. In the first chapters you will find a connected history of our starting out, after which the experience in each line, from beginning to end, will be given by itself.

The title of this book is OUR FARMING. You will notice it is quite a broad subject. It gives us a chance to tell *all* about our farming, not only our success in raising crops, but what the real object of our farming has been. By the way, this reminds me of an editorial in *The Ohio Farmer*, written by Mr. M. E. Williams, in 1887. I will hunt it up and quote a few lines.

"We visited Mr. T. B. Terry last week for the first time. * * * It is of his home, however, that we wish to speak in terms of strongest praise. It is elegantly and handsomely furnished and every room as well as the surroundings speak of peace, comfort, refinement and culture. One is impressed by the fact that this—the home—is the real objective point of Mr. Terry's efforts. He may feel a just pride in his successful farming, in his fertile fields, his nice barn and convenient tool-house, but after all they are only the necessary agents in building up and maintaining a model *home* and contributing to the education and welfare of the family."

It does one good, friends, to have his efforts so thoroughly understood at a glance by a visitor. Most kindly is he thanked for these words, and with all my heart will I try to induce others in the following pages to live as it seems to me is the only true way. Right glad am I to be able to prove in advance by such a cultured gentleman as Friend Williams that I practice what I preach. I assure you that in every line treated on in this work I will preach nothing but what I would practice, and very little that I have not practiced. It is a good plan to "do a thing first and tell of it afterwards," but I may be able to give some valuable advice from the experiences of many good farmers that I have met, that is a little out of my own line, and hence not put into practice.

In connection with the home I shall have to tell you, of course, about the small fruit garden, the strawberries, raspberries, currants, etc. I shall not only urge you to grow enough for your own use of these delicious fruits, but tell you plainly and simply just how to do it. If you wish to go into strawberries largely, and want a complete and full work on the subject, send forty cents to *The Practical Farmer* for The A, B, C of Strawberry Culture, written by my friend, A. I. Root, and myself, and published by the former. You can obtain likewise from *The Practical Farmer*, at the same price, forty cents each, my books on Potato Culture and Winter Care of Horses and Cattle, sent out by the same publisher. The two latter were written some time ago, when filled with the first enthusiasm of success. I shall, of course, draw largely on the substance of what is in them for these pages, for which due credit is hereby given to the publisher, who is one of my best and most valued friends.

In looking over the index, you will notice that nothing having any possible connection with our success in farming is left out. Such rather unusual but important questions as Insurance —life, fire and wind-storm—Buying Supplies at Wholesale, Paying Cash, Keeping Accounts, etc., etc., are fully treated, more so I think than has ever been attempted before by any other agricultural writer, and they are treated from the standpoint of actual experience.

I need say no more by way of introduction, only to express the heartfelt hope that this effort of ours may do every single reader some real good. To all my many farmer friends it is most kindly dedicated.

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# CHAPTER I.

## HOW I CAME TO BE A FARMER.

MY father was a clergyman and a part of his life an editor. So my younger days were all spent in town and city. The total extent of my farming then was hoeing in a little garden, and how I used to hate it! I think most all boys do particularly such work as was done then, all with the hand-hoe, cutting off weeds and hilling up potatoes. Yes, and I have wheeled soil to cover the corn, potatoes, etc., in our rocky gardens in the East. Gardening now, on clean, mellow clover sod, with tools so the horse can do most everything, and the boy may be the skillful director, rather than the hard worker, is quite a different matter. I mention this to show that there was nothing in my bringing up to make me fall in love with getting a living from the soil. When the first cultivator came around I can well remember how I wanted to borrow one of a farmer friend to save my back in the garden. But father thought it would certainly do more harm than good to have a horse walking around in among the vegetables. I do not know that he was particularly given to old-fogyism. Cultivating crops was a new departure. There were one or two bright spots in the garden to me for a time. For example, I read how much saffron was worth and obtained father's consent to my planting quite a large bed of it. I worked early and late over this, with visions of a little money in the future. My back never ached then as when I had to hoe the potatoes and corn and beans. Well, I got quite a crop, and it was duly picked and dried, but I never was able to sell one cent's worth. It was kept around in the garret year after year, enough to make saffron tea for all the babies in the State.

Again father, although a very good man, I fear played a sharp game on me to save his potatoes. You know the old-fashioned potato bug or beetle that would blister your hand if you smashed one on it? Well, they got into our garden and father read to me how someone had caught them by knocking them off in hot water and then dried them and sold them at the drug stores. That started me into business for myself again at once, notwithstanding those bunches of unsold saffron in the garret. Father got his potatoes saved in a hurry, and I could work in the garden from morning till night and not get as tired as I did hoeing ten hills of potatoes; but alas! the beetles, all nicely dried, eventually rested quietly by the side of the saffron. So you can see, friends, there was nothing in my bringing up to make me anxious for farming or gardening. Further, I had a very decided taste for machinery. When I was fourteen years old, and passing through the kite-flying period, I had an engine and boiler, all of my own make, with which I wound in my kite string by steam. I believe I was born a little lazy, to this extent, that I always preferred to use my head rather than my hands; that is, was always studying out some easier way of doing a thing. Many a time did father tell me that lazy folks take the most pains. I presume it did take me longer often to rig up some device for saving work, but I loved to do it all the same. But let me tell you a little about my machinery period. And right here, before I forget it, I want to say that my parents made a great mistake in not encouraging me in the direction my natural talent ran. They wanted to make a minister of me, I suppose, without regard to what I was best fitted for, and all my work in another line was frowned upon by father, although mother, God bless her! always had a soft side for me and stood between myself and many a scolding.

The boiler spoken of above was, what do you suppose? Why an old iron teakettle. I got a piece of old iron sled shoe with a hole through the center and about ten inches long. Then a hole was drilled through the center of the iron cover. The sled shoe being placed inside and the cover properly packed, an iron bolt from one to the other held the cover down, you see. When I got a kite eight feet long and heavy twine to hold it, my boiler would not get up steam enough, and how simple to rig up another teakettle and connect them with a pipe! Danger of blowing up? Why bless you I had a safety-valve on of my own make, and a steam whistle, too (I have it now)! What would a boiler be to a boy with no whistle? But I had to let steam go down to put in water. Shall I tell you how I found out the necessity for a safety valve? My first boiler was an old tin oyster can filled part full of water and a piece of tin soldered over the hole. A kind tinman did this for me, but cautioned me. I had heard a good deal about steam, but did not believe it could burst the can. Out in the garden, with a lot of boys, when father was gone, an arch of bricks was built and the can put on and a fire built. It did not burn fast enough to suit and down on my knees I got to blow the fire. Rip went the can just then, and no mortal knew the suffering I went through with that scalded face for the next few days. Mother fixed it up and never said a word, and I do not think father ever knew how it came about. I bore it and said little, but it is a wonder that my thirst for fooling with steam was not quenched. Not so, however. I was bound to boss the thing, as other folks did.

Well, I kept on at odd spells until when I was sixteen, I had an engine made all of brass that I cast myself and turned in my own lathe, which was also made all by myself (down in our cellar and used only when father was gone), and all done without money. It took first premium where exhibited, and was, I think, the fastest but one then known in the United States. I refused a large offer for it. Yes, I learned the whole trade of casting the same way I did the handling of steam. I had cast lead in a wooden mould and tried brass in the same way; melted it in a crucible at the blacksmith shop while the smith had gone to dinner. I wanted a little piece for my lathe and made a mould of *green* wood. When I poured in the brass, quicker than you could wink it went through the roof of the shop. I learned some more about steam as well as casting. Then some one kindly told me how to make moulds of sand, and there happened to be some in the town, and I soon learned to make patterns and cast brass.

Only once in his life did father ever say an encouraging word, while he said very many of the other kind, but the love of such work was in me and it died hard. I do not offer any excuse for my constant disobedience in this line; it was all wrong; but I do believe now, when after many years I look back and think it over, that father did me a far greater wrong, although of course, he thought he was doing right and I was the only sinner. Let me beg of you, dear readers, not to make the mistake that father did. If your son is plainly cut out for something else, don't try to hold him on the farm. Encourage him in any honorable direction that he may show a decided and continued preference for. But that encouraging word! It happened thus: A man with extended knowledge of machinery was visiting at our house. I became so interested that I hinted at what I had done and he at once wanted to see my engine. This was the brass one. I had made a number; the first of tin. He seemed greatly surprised, and father rather grudgingly came up and looked at it, I think, for the first time. The man praised my work without stint, and not knowing the lay of the land, turned to father and congratulated him on the talent his son showed. Now father was an absolutely honest, upright man, and he would not leave a wrong impression, even by keeping still; but he frankly told the man that my work had been done without any chance at all, and with discouragments enough to sink a ship. These are the exact words and will never be forgotten.

Up to this time I had been sent to school constantly, and had gone about as far as I could outside of college. The fall before I was seventeen, matters came to a climax. I was thoroughly aroused and desirous of doing something. I went to mother and talked it over with her. I wanted to go into a machine shop. I more than wanted to. She talked with father and they knew I had got to a point where I must be humored or some change made that would divert my attention from the one desire that was so strong. They decided to send me to Western Reserve College. This hardly suited me, but the thought of something new diverted my mind, and I went quite willingly. The years of hard study there made me forget somewhat my love for machinery, and I did study hard, for I never half did anything—except hoeing in father's garden. No particular credit to me; I was built that way.

In my junior year in college my health failed from too close attention to books and working nights too much. The doctor said I must quit at once and go to work out-doors, or soon be the subject for a funeral. I quit a year, then tried again, and again was taken sick. As soon as I could get out I went at the first work that offered out-doors, and without five dollars in my pocket. This was buying butter with horse and wagon from town to town, for a dealer who furnished the funds and paid me, I think, one cent a pound commission. This was in the fall. I pushed things and gained in strength and by New Year's day had about $300 in cash and forty pounds more flesh. This work was done for W. B. Straight. His father, S. Straight, a member of the solid firm of Straight, Deming & Co., of Cincinnati, saw what I was doing, and when the son got through with me he offered to furnish me money to buy cheese and butter, without interest, and give me half the profit. I accepted the offer and also went back to my boyhood home and coaxed a farmer's daughter into going into partnership with me. She has always claimed I married her for her money. I find by looking over my books that on March 1st, 1865, the day we were married, there is an entry to her credit of $113. Well, this was a pretty large sum to me then. I had a horse and harness and was in debt for a wagon and hadn't ten dollars in money. I was married in my old clothes, without one new thing, and couldn't think of getting my girl even a ring. What do you think of that, boys?

Well, the business prospered. The horse and wagon was exchanged for a rented corner in a warehouse, and soon a large three-story brick block was occupied. But it was a very risky business. We made $1000 for our share in one month, the spring after I was married, on butter, and lost it all that summer. This feature of the business was distasteful to me, although we made something on the average, and for this and other reasons, I sold out my interest to my partner, S. Straight, whom you have probably heard of often as the great butter and cheese king. As to the wisdom of my getting out of the business, it is safe to say that, after struggling on for some twenty-five years, I doubt whether he has as much money now as he then had. Mr. Straight offered me over $1000 a year to work for him after I sold out. I tried it only a few days. Wealthy men offered me all the money I could use to go into the same business on my own hook. For a wonder, the boy had wisdom enough to decline. I was also offered a very fine chance to go into the cattle business, West, by a merchant worth some $40,000. I have lived to see him fail and many thousands of dollars of other people's money were lost at the same time. I was offered an excellent chance in a lawyer's office. But all these were declined for one reason or another. Before I went out of the cheese business I had a chance to trade a rather poor note for $1200 for twelve acres of land near town. The land was taken. And then, boy-like, I built too good a house on the land (for a home) for our means. I say "I," for my wife told me better. I have learned to listen to her better, late years. Just at this point my father died and left me a fine farm in Illinois, and that encouraged me to build a good home. I intended to sell the farm, finish up house, get out of debt, and perhaps buy a little more land. But a Western lawyer was too smart for me. I went there with deed and had the money in my hand counting it, when the lawyer discovered something wrong about the deed that I must return to Ohio to have fixed, and then I could send it to him, and he could take the money and forward it to me. It was a contrived plan, and he got the money and moved on, and not one cent did I ever see. And still everyone told me he was all right. This put me in bad shape. The house was too good to sell, too costly for the size of town. I couldn't get a cash offer of more than half its cost. I couldn't keep it.

A friend of mine, the late E. B. Ellsworth, had a farm that he had bought for a son of his, and the son refused to take it as a gift and live on it. (This I learned afterwards.) He had rented it and got practically nothing out of it, it was so poor. No reliable tenant would go on it. Now he wanted to get rid of that farm, and turn it into money, or something more valuable, just about as badly as I wanted to sell my home. But I knew nothing of this then. Well, we met and traded, he giving me ten cows and his notes for $1500 to boot, my only object being to pay my debts and get square with the world. His notes were then good as gold. I was just green enough to think a farm was a farm and could be easily sold. I knew the buildings and fences were wretched, but thought it would sell for enough to let me out better than I could make it in any other way. After trading I tried to rent the place, as I found I could not sell at once. My eyes began to open when I found only the very poorest and most irresponsible tenants would look at it. I finally got such an one on the farm. He was to pay cash rent—$300, I think, for farm and use of ten cows. I never got one cent in money. Did get a small grist of wheat, I believe, and an old buggy. I could not ask for any pay, simply because I saw that he did not make half enough to live on himself. In December (the year was out in April) I asked him what he would take to move off and give me possession? He replied $50. I told him to go. Then we moved onto the farm, twenty-two years ago last December, to fix it up a little so we could sell it, but without a thought of staying here permanently. The year the tenant was here I came over from town often and worked around some, building fences, etc. Wife and I talked it over and thought it would be well to move here for a time so I could work steadily at the job.

I have written more fully about this than I otherwise should, because one often hears people say a man will never succeed at any business he does not take to naturally. I have no doubt I should have done better if allowed to follow the natural bent of my mind; but still force of circumstances rather compelled me to take up with a business I knew nothing about and had not the least love for. I had to rather hold myself to it at first, but with success came interest, until now I would not care to leave the farm for any other occupation I know of, and several good offers have come in late years. The last was last summer, when I refused to consider an offer of a highly honorable position in the city with a salary of $2250 a year and the privilege of writing as much as now and having the pay. The whole family sat in council over the matter. Not one of the children wanted to go. This gave me pleasure. Perhaps before this book is done I will give you some of the reasons why we thought we could not afford to leave the farm for a salary that some farmers would consider quite a fortune.

Soon after I made the trade with Mr. Ellsworth he failed. and it was long before our money matters were settled. So it was a very poor, almost discouraged, boy with a wife and two babies that moved his few effects onto the farm on that winter's day. His debts were about $3700, but one good thing his credit stood high. The money was borrowed of one friend in the city mostly, at seven per cent., on as long time as was wanted. It was secured by a life insurance policy and a deed of the farm. But this was not recorded, as the friend had full faith in me, and so aside from this friend and my wife, no one knew how hard up I really was. Of course it was quite a little help to have good credit, but it was precious little that I dared to use. Perhaps you may think it was unnecessary to enter into details as to how poor we were when we came onto the farm. It was done with an object in view. My old friend, Rev. E. D. Vance, of Kinsman, Ohio, was once riding with a young farmer and they were talking about my little success. The young man said: "Oh, yes, it is easy enough for a man to make money farming when he has lots of capital. Terry was rich when he went on the farm." It was not unnatural that one should have that impression from my being in a large business before beginning farming. We often hear in substance that a man with money to do everything can make money on the farm. This has often been told me at institutes by men who were hard up or just starting, and who thought there was no sort of chance for poor men like them. This is not true. Of course, with capital one could get along much faster, but a determined young man can work his way up from the very bottom, in this country, on the farm, even on a poor run-down farm. To bring this point out clearly and strongly I have told the whole story of just how poor we were. It would be hard to find a family starting with a poorer chance than we did. I shall try to make this point plain all through the book. We had to earn our money before we spent it, and with almost the poorest conceivable chance to do it at first. Take courage, my young friends. With good health and push and a level head, there is a good chance for you, and if your head goes wrong some at first, as mine did, you can level it up in good time, particularly if you are fortunate in getting a good level-headed girl for a partner, as I was.

Now I think you have a pretty good idea of what sort of a lad I was, and how I came to be a farmer. I might add that I was married when I was twenty-two and moved onto the farm when twenty-six. Now we will pass on to the next chapter, and see what sort of a place we came to.

# CHAPTER II.

## WHAT THE FARM WAS.

THERE were then about 125 acres in the farm. About 45 acres were upland; the rest muck swamp or bottomland. This lowland was and is very rich, receiving as it does the wash from many barnyards, which spreads fertility over it with every overflow. It did receive the wash from the barnyard on this farm, but does not now. Others are not all equally as saving, however. But for lack of sufficient fall for good drainage this fertility has been of little use. At a cost of about $500 for our share, I got a county ditch some miles long established. The land was thus drained sufficiently to insure its not injuring our health, but hardly enough to be of any great practical use. The remark was made soon after I came over here that Terry could make something if he could manage to fence in the wild ducks. This lowland has played little part in our farming. I tried to do something with it at first by pasturing it with dairy cows, and later with young stock. But before long, experience and figures led me as nearly as practicable to fence it off by itself. Then for a time I rented it, some 70 acres, for the enormous sum of $25 a year, and thought, all things considered, this was better than to try and use it myself. A few years later I sold the 70 acres of bottomland to a poor man who wanted to try his hand at it. He paid nothing down and it eventually came back on my hands, on account of the death of the purchaser. Then it was again rented for a time at $25 a year to a neighbor for pasture. It was finally sold to this same neighbor, D. W. Myers, and I now get six per cent. interest on the low price it was sold for. This will give you an idea of how much we ever got out of the swamp. I might add, however, that we got some ten or twelve stacks, or possibly more, of marsh hay, at one time or another, which was brought onto the upland and fed, which, of course, helped that a little.

After getting this 70 acres fenced off and disposed of, we had about 55 left, but not all good land by any means. In that there were about ten acres of swamp, in spots, that are practically waste. One low patch of two or three acres serves as a cow pasture, being fairly drained (not enough possibly, or practically at least, for tillage). The rest is utterly waste. Some little use might be made of it, but I have found too much luck about it. It may be overflowed any day in summer, in spite of all we can do.

A neighbor above us on same swamp, Mr. S. P. Thompson, cleared his at great expense and labor, and did get one fine crop. Another year he had to stand and see crops totally ruined, acres and acres, and was powerless to prevent it. I believe he has about decided to seed his with red top and give up tillage crops on it. Mine is waste land, except a little grass of poor quality that grows on it, and I will leave it so, after fooling away quite a little money on it in years gone by. I tried to make something out of this muck once by drawing it out and spreading on upland for a fertilizer; but that did not last long. I will give my experience in detail on this point later on.

Now we have the upland to describe, about 45 acres. Perhaps one-third of this was covered with scattering timber, from which all the best had been culled out. This timber was beech and white and red oak, for the most part. There were but few trees that were of much value except for wood. Previous owners and tenants had been too hard up to keep much timber that would sell readily. This brings the farm down to 30 acres, and with the exception of three or four acres near the house, this land was all covered with stumps. The oak and some chestnut stumps of the original clearing were still standing in large numbers. Although I was very green at farming, I remember thinking that land that had once grown such great trees must have been good then, and I did not believe it was so totally worn out and exhausted as some people seemed to think, and as the crops seemed to indicate.

The soil of the 45 acres of upland is quite variable. There are three or four acres that might be termed sandy loam. Here we had the great chestnut stumps. It was a terrible job mowing and plowing around among them at first. Why not get them out? Well, we did as fast as possible, but there was everything on earth that needed doing all at once, not one single thing in order, and only two pairs of hands to do it—wife's and mine. We had no money to hire anyone. There are some three or four acres that might be called a gravelly loam, but the larger part of the upland is more of a clay loam. This works easily when properly drained and clovered, but is heavy enough, so it must not be carelessly treated. One must stay off of it when it is wet. It will pack and make trouble if he doesn't. When I was sick one spring my man left the cattle out in a field after it thawed out, and almost ruined it for cropping that year. It plowed up in lumps that it was almost impossible to pulverize. The field was small for the number of cattle, however. The rest of land is more or less heavy clay, some of it very heavy, the regular bowlder clay of Northern Ohio. On this and much of the clay loam we had many large bowlders to sink, which I will tell you about in due time.

To properly understand what we have done, you need to know exactly what the soil was. Therefore, I have been very particular in describing it. I could pick out on the farm altogether, perhaps, ten acres of land that I could not ask for better. This is scattered around with other that is not so good and with some that is very poor. In fact, there are two or three acres that I would give away if I could get them out of the fields. And I have had this poor with the good to fight against and keep down my average yields. The poor land has improved, but I can never make it like the best, practically, particularly for potatoes.

Again, the lay of the land has been against me somewhat. Three or four acres are on steep side hills, where, in spite of all we can do the crop will sometimes be injured sadly by washing. I have had potatoes washed out two or three times in a season, soon after planting, and the seed carried to the bottom of the hill, along with tons of earth. This not only injures the crop, but also the soil, permanently. We have learned to manage so as to prevent part of this injury, but as long as rain falls and water runs down hill, this land will not be as good for tillage as the more gently sloping portions. And further, some of our land has a Southern exposure, which some summers is bad for potatoes, and some lies to the Northwest, with a bleak exposure, and wheat although we cover it with straw, can seldom be carried through winter as well as on an Eastern side hill.

Then this character of land generally has plenty of cat swamps in it. We found plenty of them here. Of course they are drained as well as practicable, and once in a while, when season is dry, pay grandly; but in spite of tiles, in a wet season, we have to see a crop scalded by a heavy rain in hot weather, before it can get into tiles, or buried in mud, or kept so continuously wet that potatoes die, while we stand by powerless to prevent entirely, although we may help some. Once in a dry year, when these depressions yielded heavily, I remember saying in *The Country Gentleman* that I wished my farm was all cat swamps. Now I wish it was all good land without any of these places where invariably almost we have to mow wheat with a scythe.

Now, I have tried to tell you the exact truth about my land. It is important that you should know this, and that the crops you will read about later on were not grown on land as fine as the sun shines on, all through, without any drawbacks. If this was the case my experience would be of little value to the farmer on ordinary land. How I wish I had even 35 acres of land that was *all* of the best quality and laid just right in every respect for tillage! But I have not this, and have worked to make the best we could out of ours, taking it as we find it. Many visitors have expressed surprise after looking over my farm, that the land and the lay of it, was not naturally better. From the results obtained they thought before coming here that I must have everything in my favor, and they have said: "Why my farm at home is as good or better than this." Prof. Thorne, Director of our Experiment

Station, told the people at one institute last winter where I was, that he had visited my farm and carefully examined the soil and looked at lay of land, and he was greatly surprised to find the natural conditions no better than they were. There is one thing that deceives many. The road runs right through the streak of best land there is on the farm. Go back 50 rods on either side and a stranger will be greatly taken down. The road is just where it enables me to put my best foot forward to those passing. Every field has grand good land right at the road, and there is no deception about this on my part. When Friend A. I. Root visited me last summer I wanted him to know the truth about my soil, and so took a spade and went back in the fields and dug down in the clover sod. But let me quote directly from Mr. Root's report in *Gleanings* for July 15, 1891, page 603. "Now I wish to emphasize one point right here. Everybody seems to be trying to find out some excuse for Terry's great crops rather than to admit that the credit belongs to Terry himself. * * * A good many have said, 'Oh, yes! Terry has got a piece of the richest land in the State of Ohio; and anybody can make a living on *such* soil as he has.' That, too, is a big blunder. We got a bright, clean spade out of the tool house, and I made it my special business to dig down as I passed through the fields. In one place where the clover was particularly rank and strong I uttered an exclamation of surprise when the spade showed poor yellow looking earth, almost exactly like the poorest ground on my own place at home. Yes, we have some ground that is so poor that I have just thrown away manure in trying to make it raise something. It is doing better, but it takes time. Well, Friend Terry has several acres yet that has never been reclaimed. As we looked it over he said it would probably not bring over $15 an acre (the real estate assessor valued the unreclaimed upland at just $15 an acre last spring). The original soil had been washed off (or was never on) and it was hard, stony, gravelly yellow clay. A part, however, of this same kind of land has been redeemed. Just over the fence there was a beautiful stand of wheat, all even, with great long heads just bending under their loads of plump grain." After telling what he thought had made the change, draining, clover, etc., Mr. Root continues: "It is the result of enthusiasm and steady work, year after year, together with careful planning and experimenting, to make the most of some of the poorest ground to be found in the State of Ohio. There is, however, *some* very good ground on the place. * * * I should like to see Mr. Terry take hold of some rich river bottom ground. There may be a providence, however, in the fact that God has seen fit to plant him where he is—on a farm that averages about as poor, naturally, as almost any farmer in the State of Ohio has to contend with. If you think I am deceived, just visit Friend Terry as I did, and take a spade and go over the farm."

You now have the word of disinterested men as to what the soil was. And I want right here to thank Friends Thorne and Root for the kind words their sense of justice led them to say. Now, how had this soil been managed? Without much attention being paid to rotation, manure saving, clover growing, etc., I fear. In fact, I doubt whether any clover seed had ever been sown on the farm; certainly not for several years. The tillage was very poor. The plowing was the merest skimming. I am judging largely by the work done by my tenant the year before I moved on. Such sort of work had been going on for some time at least. It was slip-shod throughout. The tenant had one field in corn (?). He did not get five bushels from it; never cut only a shock or two. In fact, could not find it for weeds. Much of the corn never reached three feet high. This I know, for I was around that year. His oats and wheat were what he called good crops for this land. I do not remember how the oats turned out, but I do the wheat. I was present when it was threshed. It was grown on the best land on the farm, right back of the house, and the yield was eight bushels per acre. Although he seemed well pleased with the yield, I was pretty sober, I assure you, for I was beginning to see what a wretched trade I had made. Far better if I had taken the cash I could have got for our town home, although only half what it cost, and bought some good land, if I wanted to go to farming.

That spring, when my tenant took the farm, there was one piece of land that had had a crop on the preceding year and had not been seeded (as usual, I should judge) and I wanted something done with it. Did not like to see it left there to grow up in weeds. Told the tenant I would like it if he would put in some crop and then I would try and get it seeded in the fall. He had always lived within a few miles and knew the farm well, and replied to me that he wouldn't plow that piece of land for all it would raise. Well, I have since grown 300 bushels potatoes per acre (the merchantable ones only counted) and 35 to 37 of wheat on that very land, although this is an extreme yield. It grew up to weeds that season, and I hired a man with a yoke of heavy cattle to turn them under in August, when I began my farming by making preparations for putting in my first crop. Well do I remember how this old man found fault because I wanted him to plow, not just skim the surface. The hay my tenant cut that year on the 125-acre farm to winter some 15 cows and his horses measured, in the mow, counting weeds, marsh grass and all, 12 tons. By the way, I spoke of buying 10 cows with the farm. This was the 25th of January. The tenant moved on soon, or at least took care of stock from then on, although the year was not to begin until first of April. I bought grain and brought over to him to feed them, and often came myself and tried to have the cows well cared for, but when spring came three of them died, in spite of all the tail-splitting and salt and peppering, horn boring, lifting with bags, etc., etc., that we and the neighbors could do. Oh, how awful! They died of starvation and neglect that they had during the winter, and $150 of a poor boy's capital was gone, and he found he was cheated on the cows as well as the farm trade. I took the ten cows at $500. When I was feeling somewhat blue over the dead cows, a good neighbor, Mr. Edward McCauley, just to cheer me up, I suppose, to show me that I might have had worse "luck," said: "You got off pretty easy. Why I have helped them skin as many as seven cows out of ten in a single spring on that farm." But let us turn from this terrible picture of suffering for man and beast, for with such treatment of animals, the beings depending for their living on them could hardly suffer much less—let us turn from it and take a look at the buildings and fences. The house was about 24 by 28, without counting the half-rotted down wings which we tore down at once. It was a story and a half high, had 7 by 9 glass in windows—where there was any—paint worn off mostly down to the original red priming, loose boards hanging down here and there, fire-places for big logs, and a brick oven with great chimneys to match, a roof that shed water nicely in dry weather, but had to have all the spare milk pans set around under it the first time it rained, and hundreds of rats in the partitions and cellar and out in the rooms when they chose to come. I never got them in line and counted them, but if any of you had spent a night here you would agree with my estimate. Why one night wife and I worked hard to cut up our sausage meat ready for grinding, and left it standing uncovered in pans. We heard a rat celebration or general training going on later, but it was nothing new, and we did not investigate until morning. Then we found every last bit of that meat gone entirely out of sight in the partitions and between ceiling (or rather lath) and floor above. But still the old house was lined with bricks, below, and was comfortably warm, and we spent many happy days in it, in fact, 14 years. How well that we did not know before we moved in how long we should have to stay before we could do better. How I did hate to bring my young wife and babies into such a home! We had both been used to far better quarters. Well, I painted and plastered the inside a little, patched up the roof, but never put a dollar onto the old house for looks. In truth, we hadn't it to put on. The old house was sold to a neighbor for $10 when we moved into the new one, and covered over, is now doing duty as a horse barn.

There was an old 30 by 40 barn with a shed on each end. But the doors had fallen off the hinges and the tenants had burned the boards, as also a part of the boards from the outside of barn. The roof was about like the sides, except one side of main barn, which had been reshingled not long before, but it was done about as the cows were cared for, and you could see daylight through it in ever so many places. The stable was in a horrible condition. The ten cows had not been put in before I bought the farm in January, and I asked the tenant to put them in at once, and he replied that they would be more comfortable outside, and after looking around a little I concluded he was not trying to shirk the work, but this was really the case. Stanchions, cracks, boards off, roof leaking like a sieve, and floor in awful condition—a man ought to be hung that would put cows in there, and they staid out till some repairs were made.

The fences along the road were just about all burned up for firewood. They were rail fences, I was told, when they were built. The other fences were not much better. It was simply impossible to keep neighbors' cattle off my fields for a time. One farmer of means turned his stock in the road, and they would come right here and go into my lots, and he would go by entirely unconcerned, almost taking the bread from my babies' mouths. I tried shutting up his stock, but had no place but the stable that would hold them. Put all these things together, friends, and those were terrible days! but they had to be even worse before they became better.

I wish you could have seen the dooryard when we came here —cowyard would name it better. It had been used as a milking yard, and the only possible inviting feature about it was the chance to scrape up a load or two of manure. Every bush or little tree was gnawed or broken down. To cap all, there were many acres of swamp land about, and cat swamps here and there on the upland, only valuable as breeding places for malaria, to help the local physician, and as watering places for stock, which often got stuck so we had to get help to pull them out. The well at the house—mercy! It was awful to think human beings could drink from a well surrounded by such accumulations of filth. For years we brought water from a spring forty rods away. The late Dr. Danforth told me he had to come to this farm so often he was actually ashamed. No wonder! I think all of the family that last owned the farm before it passed into the hands of tenants are dead, and I do not think Providence wanted all these deaths to take place, either. But with reasonable precautions we have never had any severe sickness in the family, except as result of accident, and we have now made the farm, we believe, one of the most healthful homes in the State, and I shall take great pleasure in telling in another chapter all about how this was done.

# CHAPTER III.

## HOW WE STARTED.

WE came onto the farm in December, having nine cows, one horse, a rather heavy one-horse wagon, harness, and a land roller. Seven of the nine cows had been on the place—were those that survived out of the ten bought with the farm. The other two we brought with us from town. One had been our family cow for years; the other I gave my note for just before we moved over. The horse, old Bill, was a steady going fellow, had the heaves, and was the worst jumper I ever saw. But he was sharp. He would jump out and fill himself in the night and be back in the pasture, sober as a deacon, in the morning. I cannot blame him much now for trying to take better care of himself than I could take of him; but it was terribly exasperating then. One funny incident connected with old Bill will never be forgotten. When we began building new fences, Bill tried his hand, or rather his feet, at jumping one as soon as it was done. The front feet went over all right, but he failed for once to elevate the rear feet quite enough, and the result was he landed on the fence in a rather dangerous position. Although I was angry enough to let him hang there, I ran with an ax to knock the boards off and let him down, for injury to him meant serious loss to us. My little baby daughter saw the situation, and with her little heart almost broken, she ran screaming into the house, exclaiming, "Ma, ma, pa is going to cut old Bill's hind legs off!" She couldn't see any other way to get him over.

There was little that we could do that winter except to take care of those animals and save the manure. This we did just the best we could under the circumstances. In regard to the manure-saving, that entire subject will be treated in detail by itself. In order to care better for the animals, I first took some logs to mill and got lumber and battens sawed. To save material these were made but ⅝ of an inch thick. There was no attempt at doing anything for looks on the old barn. It would have been useless. We tried to make it warm and comfortable with the least possible expenditure. I nailed on these boards and battens in cold weather, and even worked nights by lamp light until it was done. I paid the saw bill with logs, so really all this improvement cost me was the nails used. I kept to work on the old barn until the stables were so warm that I was entirely comfortable in there doing chores without any coat on, in the coldest weather. I patched the roof as well as I could, and put straw overhead on a temporary floor to catch the rain that came through. The animals were given a comfortable bed of either straw or swamp grass or sawdust. The swamp grass was mowed in the winter on the ice. The land had overflown and frozen, and this gave me a nice chance to cut it and draw it off with my horse and sled. Pretty big business, wasn't it, for a man who had given up a position in town with a salary of more than $1000 a year? Well, I had practically no experience in farming, but I do think I had ordinary common sense, and this told me that any animals to thrive must be comfortable; and then I do not think I could have slept well unless my animals were taken care of reasonably well. When the straw and the marsh hay gave out, I drew sawdust, load after load, for bedding. On a bed of this a foot deep the cows were very comfortable. It cost nothing but the work of getting it, and I enjoyed this, my stock seemed so comfortable on the soft bed. In after years I used many loads of sawdust for bedding, and never saw any bad results from the application of so much to the soil. I found the best way to get it was to draw in the summer time, when no one else wanted it, and I could always get plenty. It was stored in a mass in a shed and would heat and dry itself out, so it was entirely dry like dust by winter. It thus made a drier bed for the stock and would absorb more liquid manure. I had some fears that the heap might take fire from excessive heating, but probably they were groundless. Our shed would hold some 2000 bushels, so there was bulk enough to heat, perhaps, as hot as it could. The actual value of the sawdust as a fertilizer, I think, is not enough to pay for hauling it. Of course, there is some fertility in it, but I would not consider this of much practical account by itself. It is only when it will make the stock more comfortable and absorb liquid manure that I would go after it. We have plenty of straw now for bedding and do not need to use sawdust. This first year on the farm, and for several years following, we did not have plenty of home-grown bedding, and sawdust helped us out. Further, feed was worth more then than now, and as I was situated I made money by feeding out my straw with oil-meal and wheat bran and going after sawdust for bedding, and absorbent to use in the place of the straw.

When I had this comfortable stable ready the cows were put in and kept in, except just long enough to go to a hole cut in the ice in a frog pond near by, to get water. In fact, very soon one couldn't keep them out a moment longer than this, if the door was open, unless he fairly pounded them with a club. They were just crazy to get back. Their actions showed very plainly that they fully appreciated the efforts made for their comfort. But they showed appreciation also, in another way, that was rather surprising. When the tenant left he said the seven cows were all dry. It was customary to dry cows up about this time of year anyway, and these particular cows had not been fed in a way that would tend to keep up the flow of milk, even to the usual drying-up time. We were milking the two cows we brought over right along. They had been well fed through the fall. Soon I noticed that the bags of the seven were filling up. I milked them out. They filled again. Again I milked them, and as they seemed to be gaining in their milk, I began milking regularly, and it is a fact that we made quite a little butter from those poor, neglected animals. They were not half fed then; but they were better fed and much better cared for than they had been used to, and they did all they could to show their gratitude. We got them all through the winter alive, but there was little to go and come on, I assure you; the hay (?) left by the tenant was so poor, and there was so little of it. It was almost wicked that we could not do better by them in the way of feed, but, friends, they fared as well as we did in the house. We actually went without necessities to get a little grain for those cows—enough to keep them on their feet, if possible. Towards spring I cut brush for them to eat every pleasant day. I was up with one several nights, and with the help of kind neighbors got her through alive. Weakness from lack of enough good food was all that ailed her. Certain it is that without the warm, comfortable shelter half of them would have died. I haven't exaggerated in the least about this matter, friends. This is the simple truth. This is just the way we started. Would it be possible to start nearer the bottom of the ladder in farming? And still, slowly but surely, we worked up. Take courage, reader, if you are sorely pressed now, you also can work your way up.

These were the days of one-horse farming, literally. I drew some manure from town with one horse. I drew sawlogs on a sled with one horse. My wife went to town to trade with this same one-horse wagon that I drew the manure in, sitting on the high spring seat, and generally having the children with her. My credit was perfectly good, and we could get trusted for all we wanted, but it ground me terribly to ask for credit, and the Lord only knew when I could pay. I was neither a knave nor an ignoramus. I fully realized that the chances for paying were slim, and that to buy on credit, knowing my hard-up condition so much better than others did, was almost the next thing to stealing. But what could we do? It was hard to starve. Well, to tell the whole truth, I often sent my wife to town to get things, while I made some excuse about being so busy. I know it did not hurt her to go as it did me.

And right here, friends, it is only simple justice to say that if I had not had a wife that was a real partner, and did her part better than I did mine, we never would have pulled through this tight place. Far be it from me to claim even half the honor of final success. Actually, I have known her many a time to go to town with a list of things we *must* have, and come back with almost nothing, particularly for herself. She has always been consulted with and has known just how we stood. She would say when returning with little: "Things cost so much! I believe we can get along without this or that a little longer." A very little leak then would have sunk the ship. Do you think it strange that as soon as financial circumstances would possibly permit, that faithful partner has hardly had a desire that was not gratified—that I built her a new house before I did myself a barn, that the farming was so arranged as to take the least possible work into the house, and make life as easy and comfortable to her as we well could! Who cheered me on when it seemed like folly to attempt to hold out longer? Who did her own work in the house and taking the babies with her was always ready to milk, load hay, or do anything on earth that she could to help along, and always cheerfully and willingly? Who, when success began to come, quietly put on the brakes, as my more extravagant nature was inclined to run away with me, and kept me level-headed? And still, friends, have not most of you got just such faithful wives at the head of your household matters? Do not fail to fully appreciate them. The writer is not the only farmer that owes his success largely to his life-companion, not by any means.

But I was not a one-horse farmer as far as number of horses kept was concerned, except for the first winter. It seemed necessary to have a team in the spring when plowing time came. A kind relative let us have a horse—a headstrong, nervous animal that detested farm work. He was not used on the farm where he was kept, simply because they were afraid of him. He was good on the road, but for farming—well, the first time we hitched him up with old Bill we drew up a load of wood. The tenant of the season before was with me. Tom sprang into it and jumped, getting just as far ahead as he could and testing my strength and the lines to the utmost. I was much relieved when the house was reached, and the tenant helped matters by asking: "How much farming do you expect to do with *that* animal?" Well, it was that one or none, and I got the tenant and a friend to help me start him on the plow. In spite of us all he came very near getting away. He rushed ahead with the plow and old Bill and myself on the lines, and a man hold of his head, as though there was only a buggy holding him back. Although we did our best, that first furrow (we were trying to mark out a land) flew nearly a rod. That was the kind of a team I had to work with, to learn to plow with, for I had never held a plow before. May no reader ever have such a time as I did, touching up one slow, steady horse, and holding onto the other for dear life, and wrestling with the plow; yes, wrestling is just the word. Besides the wretched team for farm work, the ground was hard, in many places, turning over in chunks sometimes as large as a pail and sometimes larger, the soil having been tramped, when wet, by animals. Then there were roots and stones and stumps and briars, etc. I never did get right down to swearing, but I am afraid I came just as near to it as I dared to, and do not see how God can help but forgive me when He considers all the circumstances. By the way, I must tell you a little swearing story about that same lot. I have told of getting a man with ox-team the fall before to do some plowing. There was a tree that had blown over, lying in the way. He hitched his oxen onto it and whipped and shouted, intending to draw it out of the way. But they did not stir it. I was surprised, as they were very heavy cattle and had the name of being able to pull anything. At last good old Father Roswell turned to me and said: " If you will go to the house I will jerk that tree out of here in a hurry." More surprised yet, I asked him what on earth he meant. He answered: "I know you are a moral man and do not like to hear anyone swear, and those cattle will never budge that load without it." Well, I went away after such a plain hint, and shortly after saw the cattle go flying over the hill with the tree. I have been very sorry since that I did not get an ax and cut the tree in two and make two non-swearing loads of it.

I heard a farmer say once he sold his oxen because, although he was a good Christian man, he could not drive them without swearing. Well, I believe if he had had my horse team that I learned to plow with he would have wanted to trade for oxen. If I had had a little experience in holding a plow it would not have been quite so bad. My wife used to come out and try and help me by driving the horses. Once she, in sheer desperation at my awkwardness, I presume, suggested that she believed she could hold the plow. I took the reins and let her try at once, and, to be honest, I do not think I tried to drive as well as I could. It wasn't long before the plow got away from her in just the neatest manner possible. This is one of the pleasantest recollections of those days. Why, I just rolled on the ground with laughter (remember, I was but a boy then).

After getting two horses we still used the same one-horse wagon with a pole attached. It was pretty large for one horse, but much too light to draw a full two-horse load on. It was years before we were able to get a large, strong wagon. When we did get it a neighbor remarked that we had to sell our timber to pay for it, which was true, and it was a good business move, too. Men who had known me as something of a business man in town used to wonder why I worked to such disadvantage at first on the farm, not knowing how terribly hard up we were. In 1881, after paying the last dollar of our debts, I for the first time told some friends what we had pulled through. Among others, I well remember giving Mr. S. P. Thompson, a neighbor who had always stood by me in my darkest days, a full history of our ten years' struggle. "Now," he said, "I can understand some things that greatly puzzled me at the time—why you did not buy a good wagon sooner, for example." I have often thought that perhaps I was over-cautious. Perhaps it would have been wiser to have gone in debt more for some things that were most urgently needed, but I couldn't feel then that it was right, and presume that I should do about the same again in like circumstances.

For tools I had a roller that I brought with me, having had a chance to buy it for half price that summer. A new plow was purchased. I took a picture of a Geddes folding harrow to the blacksmith shop and got the smith to make me one like it. My older readers will remember this implement. It was the next step up from the old A harrow. It was practically an A harrow with a hinge in the middle, with twenty-eight 1¼-inch square iron teeth driven straight through the wooden frame. I found a picture of it in R. H. Allen & Co.'s catalogue of implements, machinery, live stock, etc., published that spring. I hunted up this book to-day to find the name of harrow. And just think of it, I paid $1 for this catalogue! It is quite a curiosity to look it over now. The "improved expanding cultivator" there shown would certainly make a Planet Jr. laugh in derision at the idea that it ever descended from such an ancestor. But I have to thank this book for some good hints. I bought that year a Cahoon seed sower for $10 (half that or less now), and not long after an Albany corn planter, both of which were pictured in this $1 catalogue. With these implements, which were ahead of what many had in those days, I turned the clods over, stirred them around and mashed them down the best I could. I think from the very start I did better work in tillage than was ordinarily done at that time. It was not any such work as I see now from my window, as I write, in our potato field, but it was creditable for the implements we had to do with and the condition of our soil. We could have done almost nothing without the roller, and still few had them in those days and they are none too common now. The first season I bought a Buckeye mower of an agent who came here, on credit, of course. He came here with a horse, and, staying till noon, I could not help asking him to eat with us. I plainly told him we were very poor and just starting, but he was entirely welcome to such as we had ourselves. After dinner he told me that I was making a mistake to live so poorly, that I ought to get enough good food to eat, fresh meat, etc., and said: "Now when you come to Akron for your mower, don't you bring any dinner. I will take you to my boarding house and feed you and your team. Remember, now." And there was a hint in his manner that I would get a better meal than he had here. This was to ease his conscience for sponging on us poor folks when he was making lots of money. Well, I took no dinner when I went to Akron. After he had loaded the mower on for me and got my note he coolly went to dinner without a word to me, and I went home without any and my horses, too. I feel like publishing his name, but have charity enough to think that possibly he forgot, and forbear. How such little unpleasant incidents will stay in one's memory! We got along without a horse rake the first year. And really I had better have worked out in haying that year and bought hay and not got a mower at all. The condition of fields and crops was such that the mower was a very poor investment. For example, I worked around among stumps and stones most of one forenoon with mower and scythe and raked by hand and loaded about all the afternoon and drew all the hay (weeds and stuff, I mean) to the barn about dark, at night, on that one-horse wagon. My good neighbors on either side were very friendly to us in our poverty and let me take a horse rake whenever they were not using it.

# CHAPTER IV.

## MIXED FARMING.

REMEMBER that I started out with practically no knowledge of farming. There was only one thing to do, and that was to work about as my neighbors did. In fact, I had never given any particular thought to the subject, and, doubtless, supposed that there was only that way to do. I kept the cows I had and bought another, so as to make us a small dairy, because every one else kept a dairy. That was a part of farming as I knew of it. I tried to get in every crop I could that others about me raised, with no thought but to get the work done. I spread myself over just as much of the run-down upland as I could that first season. I put in a large garden, and knew more about how to do that than anything else. The common custom then was to send the milk to the factory. Cheese factories were just well started all about us; in fact, I started the first ones before leaving the firm of Straight, Terry & Co. About this matter I must have thought some. I remember reading in *The American Agriculturist* about this time, that one could bring a farm up better by making butter and selling that and feeding out the skim milk on the farm. This seemed sensible to me, and we did this way from the first. It put a great burden of work, however, on wife and me. But we were young and willing and cared little for hard work if success would come the sooner. About 40 rods from the house was a spring. I dug this out and put in a box for the water to flow into, built a cheap shed over it and got some deep tin pails to set the milk in. By the way, what a time we had the first time we tried to take the cream off one of these pails! Neither of us had ever seen anything of the kind in use, nor read the particulars. I tried to skim that pail with a common skimmer, such as we used to skim milk in pans. Of course, it all ran through, being thin and not dried and leathery, as on a pan. I told my wife there was no cream there; this sort of work was a failure; cream wouldn't raise in a deep pail. But one or the other of us at last discovered that the top of pail did contain a little richer-looking milk than was found lower down, and we got a little tin cup and tried dipping this surface off, and then had no more trouble. We sold our butter for a fair price and raised all the calves we could. Aside from the cow's own calf, we bought another as the season advanced, and thus raised about two calves per cow. And we succeeded pretty well at this.

There were 70 acres of bottom pasture that we must have young stock to put on, and our only way of getting them seemed to be to raise them, and we pushed the matter this first season and afterwards. But, oh, the endless amount of hard work it put on us in proportion to the pay received! In the morning we would milk the cows and hitch up and take the milk to spring house and set it, and then skim the milk that had stood for 24 hours and take it back to house, warm it, or make hot porridge of oil-meal and wheat middlings, and mix that with the milk to warm it to blood heat. We were very particular about this work, and the calves showed it. Then, after a pull at calf feeding, we ate our own breakfast. I think it was often 9 o'clock before we got through. Then I rushed off to my day's work, and worked hard until dark—yes, in summer,—and then went through the milk-and-calf performance again. Wife often milked most of the cows before I got around, with the little children by her side. She also went to the spring and made the butter, while the babies played in the shade near by or slept or squalled, as they happened to feel like. Then we got our supper and tumbled into bed, totally exhausted. Of course, we had no business to work like this. It was wrong; but what better could we do under the circumstances? I am giving facts, however. There were plenty of other farmers who worked like this then, and I can point you to some to-day who, in their ambition to succeed and because they are very hard up, are simply making slaves of themselves. We could not hire a man to help do this work—no, not in the way we were then working. A good old neighbor, who was always very kind to us, said we could not afford any regular help; that it would sink us, and, I think, he was right. Why, friends, our cash sales the first year were only $300, and that wouldn't much more than pay our interest and taxes. You must remember that cows, wintered as they necessarily were, and fed on poor pasture the next season, couldn't do much, and land that produced almost nothing the year before could not improve much in a single season. No, we struggled on alone. It was wisest then. As my neighbor said, "Do what you can yourself, and let the rest go." This we did, and nearly killed ourselves in trying to not let anything go. We paid out that first season only one dollar for help. That was wisely expended in hiring a young man to help me get in a lot of hay that I cut on shares for a neighbor. I actually pitched off loads of hay onto the barn floor, driving up side of the doors when I was in a hurry in the afternoon, and then carried them up a ladder, one forkful at a time, in the morning, or rainy days, and mowed them away. Those were hard days. We never lacked enough of something to eat, but fresh meat and fruit, with the exception of apples when we had them, and luxuries were not for us. We spent absolutely nothing the first few years for anything to wear. We were fairly well supplied with clothes when we moved to the farm, and these had to last. A gentleman calling here once, who had known us long, said, " Your clothes last like those of the children of Israel, and if you should get a new hat folks wouldn't know you." We can laugh over this now; but, oh, how it hurt then. We were not paying all our interest as it was, and were doing just the best we possibly could, according to our light. Of course, we did somewhat better year by year, as we gained by experience and as our clover growing, manuring and tillage began to tell. I have given you the darkest side when we were at the very bottom. I shall not attempt to give a connected history of these first years, only a general outline of how we worked. Nor am I certain that every incident is exactly in order. One forgets after so long, but the facts as given can never be forgotten, only, perhaps, the exact order in which they occurred. Had we been making money and moving right along towards success, evidently our hard work would have seemed light, and we would have cheerfully endured going without nearly everything that would make life pleasant. As it was, the writer became heartily sick of the endless worry and drudgery of his life and that his wife had to endure. He was disgusted with trying to do a little of everything and the inability to do anything really well unless something else was neglected. If there is anything that makes hard work really a pleasure to me it is the ability to do that work just as well as I can. You can, perhaps, imagine how I fretted under the circumstances I was in, when not too utterly exhausted to think at all. Working like a slave, with nothing to show for it and no prospect of anything! That was the serious truth that slowly began to come home to my mind. We had simply dropped out of town life, and almost knew our friends no more. We actually could not dress fit to go to church or anywhere. Well do I remember when an old friend died and his funeral was held in the church. He had been so kind to me in years past that I felt that I must go to his funeral, but I hadn't a decent thing to wear. It was early in the season, and I had a white linen coat or duster that a brother-in-law had given me the year before. I put it on and went, and I went up to the front to see my old friend's face, but, in spite of my sadness, I could not help but feel the amused glance of a hundred pair of eyes. Every spark of the old Adam within me flashed with anger as I tramped homeward. What could I do? What should I do? Give up, and go to work for some one in town or city at good wages, which I could get? Why the little home in town which we could have and the better life seemed to me like paradise regained when I thought it over. I have sometimes thought I did wrong in not yielding and going where I could care for myself and family better. But it was always hard for me to back out or give up. When a boy in school I often made a poor recitation because I wouldn't, or, rather, could not, skip a hard example or difficult point to understand. I spent all my time digging away at that, while some would skip such places and know all the easiest part of the lesson. Once in a while I had a triumph, however, when called on some hard place that I had thoroughly mastered; but just the mere mastery, if no one knew it, was sweet to me. Some of the old conquering spirit of revolutionary ancestors, perhaps, was inherited. About this time I was sitting under an apple tree in our dooryard one evening when two men passed by in a buggy. They were old town friends. While passing my place they naturally thought of me, and one said to the other, "What is Terry agoing to do down here?" The other man, Mr. John Farrar, replied, "If he sticks to it he will make a success of it," and they passed beyond hearing. Little do we know what influence a single careless remark may have sometimes. As I remember, I was thinking some about giving up; as my city brother-in-law expressed it, "about letting those farm who could not do any better." That casual remark, perhaps, turned the scale. I hardly knew how to take it, either. I had changed around some, and did not know but my friend thought I would not stick to anything, or he might think that I had some ability and might succeed at what I undertook. At any rate, I know I determined I would "stick," and I would conquer right there before I left. I did not then stop to inquire whether it could be done or not; it had got to be done, and do it I would, or die in the attempt.

When a rainy day came and I could spare the time I used to go out to the barn and just sit down and think and figure. Sometimes I would go out and sit under a tree with an umbrella over me, as far from the house as I could get. This was a favorite study of mine in those days. It was here that light began to first come to me. In those lonely thinking days, it seemed to me that there was no possible chance to go on as we had been doing, and ever make enoughto pay our debts, and get ahead, and have a nice home and our reasonable share of comforts and luxuries. Time after time I figured this matter over. A young man from Union County, O., called here the other day for advice. He had $2,000, was thinking of buying a farm, and had sheet after sheet of paper covered with figures as to what he would grow and what each crop would come to and what his expenses would be. I couldn't help but remember that he was doing about as I did at his age, but still I had to caution him that it depended on the man largely, whether he would just force the farm to come to his figures. When figuring and thinking, I understood very well that improvement could be made in every line. We could gradually get better cows and take better care of them, and make more and better butter, and we could raise larger crops, keeping right on in the line we were in. I was young, and inclined to be hopeful and enthusiastic in those days. I found it easier, however, to figure, than to make my figures for the future high enough to be enticing. I figured on what the best cows were doing where they had every chance, as I learned from books and papers, and on crops, as high as the best land in town produced, and deducted necessary expenses, and turned gloomily from the contemplation of how long it would even then take to get out of debt, say nothing of anything more. Finally, I began to ask myself whether there was not some other way. What are we now doing? Why, working like slaves all summer to raise crops, and then all winter to feed them out, and we just get a little income from the butter, and some time will have some stock to sell. The horses eat the oats we raise, the cows the corn, and both devour the hay. Some of this little income must go to buy grain for winter feeding, and some way we do not seem to get our fair share. Then I would figure on what the hay and grain would sell for in market, and these figures were much more inviting. But then I thought I *must* have the manure anyway, and so was driven back to stern realities again. But, little by little, new ideas were coming to me and I was getting to the bottom of the matter. Never did I study over any Greek root when in college as I did over this problem. At last I had the figures thoroughly arranged and studied over and decided to make a change. I carried my cows through the winter in the best shape I could, and in the spring offered all but one for sale. The five best ones, as I remember, were sold to a farmer for $300. He gave me his note for the sum. In pursuance of the plan I had formed, I must have the money for expenses that summer, as well as interest paying, and I took the note to Lawyer Foster, who had told me beforehand he would buy it, and got the money. When the farmer was notified by Mr. Foster that he held the note, he was quite vexed with me; but it was hard for me to see why, if he intended to pay when due, he could not give the money to one man as well as another; but the point came out when he said, "Foster will want the money when due, or a larger interest on it." Well, I was sorry to make a farmer pay extra when I was so hard up, but I must have my money or go under.

After getting rid of my stock and, of course, the calf-raising, I had time to do something, and I had planned to work quite steadily with my horses. When I was milking and fussing with calves my horses stood idle. During those hours, and many of them, I was getting, perhaps, $1 a day for my time, more or less, when a man and *team* ought to earn $3 at least. If I could do enough of dairying and calf-raising to hire a good man to attend to it, and I and team go on with work, it would promise better; but this was impossible as I was situated, and I had other plans. Now, what did I do? Why I put in every acre I could with anything that would feed animals,—anything in the line of forage crops, but no grain. The little land seeded that promised a good quantity of clover hay, and that could be cut twice to increase the amount, was left; the rest was sown to Hungarian grass and sowed corn, and rye was put in in the fall to be grown and cut for hay and then plowed for Hungarian or corn.

Of course, some help was necessary now to secure these crops, and a little was hired. I felt that I was doing something that would pay; that I could afford to hire some and get a profit on the labor. The old barn was filled until it fairly groaned, and stack after stack was put up outside. "What is the idiot, the town farmer, going to do?" was the question of the day. But he kept his own counsel. "Just look at the feed he has got, and no stock." Well, dairying was the main business in the neighborhood, and farmers were apt to overstock in summer. There were plenty in the winter that had more stock than feed, just as we had had and others before us on this farm. I had no difficulty in picking up some farrow cows in the fall cheap, on time, to feed for beef, and I got some cows to winter at prices corresponding fairly with what hay was selling at in market. You see, if a man is out of hay he has got to buy at market price and move it home, too, and I figured it would be less trouble to him to pay about the same price and take his cattle to the hay. Of course, he would not thus be bringing fertility onto his farm, but many farmers did not think or care for this. From the very first this new departure worked, and we increased it the next year. And I was getting good pay for my labor in summer in raising the crops, as there was money in them at market price for hay and feed, and then I got paid in the winter by having a manure pile that I would not have if feed was sold off the place. I was getting all the money there was in growing for market, which is nearly always more than can be made by feeding out regularly, and all the advantages of feeding out with none of its drawbacks, particularly that I had my whole time for work in summer. My farmer friends were hard up, many of them, as well as I was, but feed was always considered cash, and I must have my money, so a contract was made that all bills must be paid before stock was taken away, and they always were, with a single exception. One man took some calves away when I was not here and cheated me out of $23. He has never prospered since, and has lost his farm.

As I worked up in this direction, additional cheap sheds were built around the old barn each year; just merely shelter, nothing for looks. These stables were made very warm and comfortable. I hauled the logs, and with the lumber built them myself, working with a will, for at last we were actually making something, and in a few years more we might be our own masters. But we were just as economical as ever, or very nearly so, thanks largely to my wife. Would you believe it, we actually had as many as fifty and sixty head of stock going comfortably through the winter, not barely skinning through and "on the lift" in the spring. Those three cows that the tenants skinned were the last that ever died on this place, except as result of accident. And after we got fairly on our feet we really took in one winter $1,100 in cash in four months for feed raised on the place. This wasn't wonderful, but it was wonderfully better than a total gross cash income of $300. I well remember my friend and neighbor, Edward McCauley, coming into my barn in the winter, when some sixty animals were warmly and comfortably sheltered therein, and with plenty to eat. After going all through the stables he said to me: "Terry, this seems like a miracle." He was the same neighbor that had helped the man on this farm to skin seven cows out of ten that he had tried to winter. Of course there was nothing of a miraculous nature about it, but just the natural result of a business-like attempt to do one thing well, in a direction that there was call for just then.

This is the way our special farming began. It was not something learned from reading, but it was thought out first and then worked out. This is the way the first ray of light came, and as soon as it began to shine I was encouraged to think and study more. I had more confidence in my own judgment, and the results which will be found in the next chapter were gradually worked up to.

During the first years on the farm, as a matter of necessity, I sometimes worked away from home to get a little ready money, and some crops were put in on other farms on shares, because my own was not in shape to pay a profit for working, and I was not able to put it in shape. Draining, clearing and other work was needed, and it took time to get around so as to do all this. Sometimes we absolutely must have a few dollars, and I must leave work at home that might eventually pay better, but would bring no ready money. So I worked along, pulling every possible string to get a start.

As for this matter of mixed or diversified farming, I do not believe in it in an old settled country, with good facilities for marketing. When the country was new, and practically no markets and no cheap transportation, it was not only wise, but necessary. Little by little times have changed, and what wonderful changes there have been in all lines of business! Do farmers think they can keep right on doing about as their fathers did and still do as well as is possible? Well, I could not. If I had kept on at my diversified farming, doing the best that was possible on the little land I had, I doubt whether I should be out of debt to-day, to say nothing of new buildings and much comfort that we have had for the last ten years. If I had kept on I should never have been heard of out of my own town, this book would never have been written, or if I had written one it never would have been wanted. Any such results as we have obtained could not have been approached by mixed farming. Nor is there any other way out for very many farmers, only to shut down on trying to do a little of everything and learn to do less things better. There is no longer any money in half-way work, and still a farmer who follows old-fashioned mixed farming oftentimes cannot do his best, no matter how much he may wish to. We must get into shape, so we can make what we do pay. I have got in that shape, and been in it for some time, and I know practically about both sides of the question.

The confession of Mr. Geo. Dow, of New Hampshire, given in *The Country Gentleman* some years ago, admirably illustrates the point under consideration. I cannot do better than give it in full. He says: "I started out last spring with a big mistake in laying out too much work for the season, and, as a consequence, I had to neglect slightly *everything* about the place, or else neglect some one interest *entirely*—just drop it and let it go. But what should I select to go?" Mr. Dow gives most of his attention to growing small fruits, but also keeps quite a number of chickens and pigs. He says: "I concluded before I began operations in the spring that I would buy what few cabbages, beets, squashes, turnips, etc., the family required, and thus relieved my mind of one care. But we must have lots of potatoes for winter use, and, as it would be too much of an expense to buy all of these, I concluded to put in an acre. I keep only two cows—enough to supply the house with milk and butter,—but, with my horses to feed, I am unable to cut enough hay on a small farm for all, and I was particularly anxious to raise enough corn fodder to help out—so prepared an acre of ground, made it rich, and stole time enough about June 1st to sow this to corn for fodder. The last two ventures are just where I cut off more than I could chew. The field of potatoes and corn was the last straw that broke the camel's back, and was too much for me. I had better have left them out. However, everything went all right for a time, until the corn and potatoes got well started, and then I ran plump up against a stump. Strawberry picking, hoeing, haying, pigs and chickens were all calling for attention at the same moment. The strawberries *must* be picked; the trees *must* be cultivated; the hay *must* be cut early; the pigs and chickens *must* be attended to, and so on. With all these there was not a moment's time for the corn and potatoes. Meanwhile the weeds and grass were having a lively race with the same to see which would win. Extra help could not be hired. I was in a box. Something must be done to straighten things out. It would not do to neglect everything. Better sacrifice one crop and save the rest. This I concluded to do, and reluctantly selected the corn fodder as the one crop that must live or die, and withdrew all labor and attention from it. But this was not enough. Something else must be dropped, and the potato patch it was this time. Relieved of this much we were able to pull through in good shape, and I calculate that by ceasing my labors and efforts on those two crops I was able to concentrate them on others more important to me, and by so doing give them all the attention they required and make them a success, and in the end they paid me double the money they would have given had I tried to keep all going along with the necessary neglect I should have to give each. Of course," Mr. Dow says, "my corn and potatoes were miserable failures, but I have made up many times the loss by thorough care of the other crops. I consider the mistake I made a serious one, and one that nine out of every ten farmers make every year."

Now, I am well aware that nine out of every ten farmers in some sections will favor the old mixed farming, and think Mr. Dow and myself are all wrong. "Why, holy horror," they will say, "just think of a farmer buying his potatoes or fodder for his cows! He ought to raise it, of course." So he had sometimes. So he always needed to once. But should we not have a little business sense? Which was best for Mr. Dow—to not have planted that field of corn and potatoes, and thus saved time and money, or to plant them and then let them go as he did, or to let every crop suffer a little? About the last two he decides wisely. He did well to drop the two crops. But he would have done better never to have put them in. This is essentially what we have reduced our farming to—doing less and doing it better; to not putting in crops that often must be neglected. So, now, kindly turn to the next chapter and learn all about what we have done in this line. Even if you do not believe in the doctrine, it cannot harm you to hear the story. The man who has tried a matter long and faithfully ought to know something about it. The most bitter opponent the writer ever had in a late paper said there was no question but what our farming had been a financial success. Don't you want to succeed? I will try and show you that it has been more than that—that it gives us far more time for the enjoyment of life, far less worry. And you must remember that I have no pecuniary interest in pushing this matter. It matters not one cent to me how others do, only that I would like to be helpful to my brother farmers. I would like to help thousands of them from the lowest depths which we have been in ourselves up to ease and comfort and independence. Special farming will not of itself do this for any one, only give him a better chance, if the ambition and push are in him, to do it for himself.

# CHAPTER V.

## WHAT WE HAVE DONE.

IN the last chapter you have the first beginning of our special farming. You cannot help but see it paid better than the regular diversified plan we had been following—the common way. If you will excuse me for saying it of myself, I had put a little study and thought into my work. Someone has said: "Work is the engine which draws the car of success." Well, that is a very good motto, but it can be improved on. Work, hard work, early and late, plenty of it, did not of itself bring success to us. Let me draw a picture for you. Here is a huge car labeled "Success." In front of it stands a powerful locomotive, and written over it is "Work." Is the picture complete? No. You want a skilled engineer in the cab with his hand on the lever and his eye looking ahead. Over him we will print in big letters "Thought." Then we have the corrected motto: "Thought is the skilled engineer who directs the engine work which draws the car of success." In other words, well-directed labor pays. This is just as true on the farm as elsewhere. I am not claiming that my labor has been wonderfully well directed, but rather the more we studied and thought the better it paid. When we got up to an income of $1,000 or so a year, we were not satisfied at all, but rather stimulated to study harder. I knew then about what it cost me to raise each crop, and it was easy to see what ones paid best. I remember very well the first potatoes raised to sell. The first load was taken to town and traded for a supply of flour. The profit on them was large, even with our very crude methods of culture, and only growing them in a small way. The quality was good. My soil seemed well adapted to potato-growing. Akron, quite a good market, was within driving distance (twelve miles). I decided that I could make still more money by gradually working out of the cattle wintering and feeding business and devoting my entire strength and time to potatoes and wheat to sell. I first thought to continue keeping some stock winters, but soon found that to pay it must have my close personal attention, and if I grew potatoes largely and wheat there would not be hay or other feed enough to make it worth my while, particularly as cattle-feeding was not paying nearly as well as formerly. Now, do not imagine for a moment that I made any hasty changes, or large ones. No, I had done well so far, and every new move was made with the greatest caution and only after much figuring. After deciding on the potato business as the one I could do best with, I did not raise hardly any at first. My land was not ready. The lots were not in proper shape, nor were they cleaned up for tillage, and the much needed drainage was not done. But after a general plan was decided on every move counted toward the end in view. Meanwhile, something was being made out of cattle-feeding. When matters began to be in shape to promise reasonable success I put in some five acres of potatoes. That seemed like a big thing then. Of course, all the work was done the first year in a costly way. We had little experience. I led the horse while my man plowed out furrows with a one-horse plow. The seed was dropped and covered by hand, and they were hoed by hand. There were two acres of early potatoes, Early Rose, and about three of Peachblow. In spite of the great cost of raising the crop, the early ones paid me some $20 an acre clear net profit above all cost of production and use of land. I figured closely, and knew to a half cent a bushel what they cost. This was quite encouraging, as I got good pay for all my labor and that of my horses, besides the profit. But I have a worse report to make of the Peachblows. They did well; I had a fine crop. They could have been sold readily for forty cents a bushel at digging time, and would have paid as well as the early ones or better, but everybody said, "You had better hold them. They will be much higher in the spring. I would not sell any for less than fifty cents a bushel." Well, I had no experience, but wanted all I could get, kept them, and never got out of them one-half what it cost to raise them. This was discouraging, but I had not gone into it very largely and could see it was a fault of judgment and not the business that made the trouble, and I pushed on. As I remember, some seven to eight acres were put in the next year, and I began to work and study over cheapening production. Well, we made a perfect success all around, selling and all, and an increased net profit. Thus the business grew, and we began also raising wheat after potatoes to seed with. Of course, we did not do the best possible at first, but we kept steadily figuring and working until there seemed to be no chance for further improvement.

Our rotation at first was not the best, but was good. It was:

1. Timothy and clover.
2. Timothy and clover.
3. Wheat.
4. Potatoes, mostly late ones.
5. Early potatoes.
6. Wheat.

This was when we had the manure from animals wintered to put on potato land, or was expecting to have it. The sod furnished the wheat fertility enough; manure, as far as we had it, fed the potatoes, and we saved some injury from cut worms, etc., that we then had on a two-year-old sod. The manuring and cultivation of potato ground would bring a good crop of wheat the sixth year. All this has been greatly improved on, as you will find in chapters on Potato Culture elsewhere. My first crop of wheat yielded only twenty-three bushels per acre, but the next was much larger, as we came to know more about the business, and, by the way, we have never grown a smaller crop than that first one in all these years.

Of course, as we increased the number of acres of potatoes planted, we did less at cattle-feeding, until one-third of our cultivated land was in potatoes each year, and one-third in wheat, and the same amount in timothy and clover or clear clover. When that point was at last reached, we had arrived at the condition of affairs we had long been aiming for; and, friends, the actual cash returns surpassed the wildest figures I had ever put on paper. At first, of course, we did not do the best that could be done. I will give you the exact figures for two years after we got well under way. They are taken from our Ohio Agricultural Report for 1882 and 1883, and are for the years 1881 and 1882. The State Board offered a prize of $50 for "The best accepted detailed report of the best and most profitably managed farm of 50 acres or more." We sent in a report of our farming and got the $50. These figures are from that Report, and are correct to a dollar, and actual cash sales, except where noted afterwards.

1881.

| | |
|---|---|
| Lot 1, 6 acres; Crop, Early Potatoes, 531 bushels, sold for . . . . | $471.00 |
| Lots 2 and 3, 5½ and 6 acres; Crop, Hay, 45 tons, two cuttings, sold, fed out on place, for $8 per ton . . . . . . . . . . . | 360.00 |
| Lot 4, 6 acres; 5½ acres Potatoes, 869 bushels; ½ acre Squashes, sold for $80 . . . . . . . . . . . . . . . . . . . . . . . . | 967.00 |
| Lots 5 and 6, 6 and 5½ acres; Wheat, 38 bushels per acre, sold for $1.50 per bushel, and Straw $92 . . . . . . . . . . . . . . | 747.00 |
| Total receipts from 35 acres . . . . . . . . . . . . . . | $2,545.00 |

1882.

| | |
|---|---|
| Lots 1 and 6; Crop, Wheat; 35 bushels per acre, sold for $1.15; 7 tons Rowen at $8, and Straw . . . . . . . . . . . . . . . | $587.00 |
| Lots 3 and 5; Crop, Hay, 30 tons at $8 per ton; 6 acres Clover Seed and Straw, $90 . . . . . . . . . . . . . . . . . . . . . . . | 330.00 |
| Lot 2; 5 acres Potatoes, 950 bushels, sold for $424; ½ acre Squashes, for $120 . . . . . . . . . . . . . . . . . . . . . . | 544.00 |
| Lot 4; Potatoes, 1,180 bushels, sold for . . . . . . . . . . . . . | 571.00 |
| Total receipts from 35 acres . . . . . . . . . . . . . . | $2,032.00 |

1881 was a very dry season, you will remember, when potatoes were generally a failure in Ohio and wheat was pretty poor.

The yield was not large, but they brought a large price. Those from Lot 4 sold as fast as I could dig them at about $1 a bushel. The early ones were sold in July before the great scarcity was known, and the price was consequently lower. The wheat in 1881 was sold at the mill in Akron for grinding. The straw, fed out in the barn with wheat bran and oil-meal to stock I was wintering, brought me $92 more than the feed cost. There was a tremendous lot of it. There were four large loads of sheaves per acre when we drew in the wheat. Now remember, these facts were published at the time in our Ohio Report, and the men who helped draw in the wheat and thresh it and draw it to Akron, and who picked up and handled the potatoes, and knew all about it, read this Report. The Secretary of the State Board lived in my town. If I had desired to, you see, I would not have dared tell anything but the exact truth. That was large enough. Why, I could hardly contain myself when I was going to Akron every day and bringing home $50 each night. When I brought home that $655 for wheat, I took $500 of it and paid the last of my old debt. So you may know we had made considerable before that, but hardly as much in any one year.

1882 was an excessively wet season. Some of our wheat and potatoes were entirely washed out on side hills. We lost some 400 or 500 bushels of potatoes by rot for the first and last time. This cut our returns down rather below the average. In the foregoing figures only the merchantable potatoes actually sold were counted. Some of the hay was fed to our horses. Along during these years we lived comfortably, not as well as we do now, by any means, but far better than at first, and after paying all expenses, laid up on the average $1,000 a year towards paying our debts (until they were settled) and building new house, etc. During the two years aboved named our help cost us, board and all, about $400 per year. As I have said, we got out of debt in 1881. We also paid a neighbor, Edward McCauley, $380 for a pair of horses that fall, and they were good ones. By the way, they are the ones that have had only clover hay to eat for past eleven years, which you will read about later on. In 1882 we laid up some money. The old house was getting almost un-live-in-able. We had waited long to make some show for what we were doing. Two friends were talking together, and one said, "Terry is making money like smoke." "I don't see as he is able to build a new house," says the other. No one knew, you remember, that we had a heavy debt to pay and much interest before our home was our own. No wonder they had little faith in my making money when we lived in such an old shell. All these things taken together made us in a hurry to build our new home. As we got nearer to the time when we could, it seemed as though we could not live in the old house any longer. So in the spring of 1883 we began to build, and also let out a link and put in 24 acres of potatoes—two-thirds of our cultivated land. It had been our intention to put in but 18 acres, leaving some 12 of wheat and half as many of clover to mow for the horses (we had got about out of cattle business then). But in the spring, after the clover was plowed, the wheat was so badly winter-killed that we decided to plow half of it and plant potatoes again. This wheat was not water-killed, mind you, but frozen down into the roots by a sudden change to very cold after some days of warm weather. But we were more frightened than hurt, as the wheat left came out pretty well after all. This was soon after I began writing some for the papers, and one man suggested to me that he would not say anything in the papers about planting so many potatoes until I found how it came out. He evidently thought we had undertaken too much. But we had had considerable experience and the crop was grown and turned into money in good shape, and we pocketed nearly $2,800 for the potatoes alone. This was the largest return we have ever had. The house was completed that fall and paid for, cash down, about $2,500, and about $1,000 worth of furniture was bought.

Some of our talking friends then said, " Well, he has built a house, but it will sink him." We heard that we had borrowed the money of a certain man who had a mortgage on the farm, and also that a rich brother-in-law had given it to my wife. It was so hard for them to believe that any one could make money when they were not doing so. We quietly laughed and kept still. The next year we held on and let our money in the bank increase a little. We had been terribly hard up so long that wife and I determined, come what would, we would never spend our last dollar for improvements. We could have paid our last $500 on debt sooner, but waited until we could spare it and not run any risk of getting short. Oh, how much easier to make money when you have cash capital to work with and take advantage of all opportunities! In 1885 we could hardly undertake safely to build a new barn, as much as we wanted to, so we did what helped us out greatly—built a nice tool house, 22 x 56 feet, at a cost of $400. This year I think it was that we lost a part of our potato crop by having them freeze down after they were well started. This held us back a little, so we did not build a barn until 1887. Then a good one, costing $1,400, was put up, and paid for cash down. Later the large covered barnyard was finished up, and some $500 worth more furniture bought for the house, as well as carriages, new harnesses, etc., for the barn. When we built the tool house it was said that would certainly sink him, on top of the house. But, after the large, fine barn was finished up and painted three coats, people stopped talking, as far as I know. They began to think, I suspect, that our farming was on a safe basis. It was—cash down for everything.

Now please compare the almost valueless buildings and their equally poor contents that we started with, with what we now have. The fire insurance agent has just been around, and I have been taking a careful inventory of buildings and contents, and find I do not like to risk a policy of less than $8,400, and that would not replace near all in case of fire. But many of you who know of me will say, of course, "Why, yes, but you made much of this money writing." Hold on; not too fast. We will put what I have made that way against what we have invested outside of farm, and against the loss I have made necessarily on farm from not giving my whole attention to it of late, and it will hardly balance it. This is the exact truth, friends. Until the last two or three years I have not made any great amount by writing and lecturing. I never wrote any until the fall of 1881, and you have the figures above of what was made from the farm that year and the two following. I had reached success before any writing was done. Again, I have never asked for any job of writing or lecturing. All such work has sought me, and, coming to me, I have felt it rather a duty to do what I could to help up agriculture with pen and voice, without regard to the money in it. I am not making as much from the farm now, on an average, as eight or ten years ago, when I gave it my whole attention. I cannot do it, or any other man. One cannot serve two masters and be entirely faithful to both. I have reached the point now where writing pays me well, and I must serve it well, while trying to do good, creditable work on the farm. But I simply cannot push the farm to the utmost, when half the time at my desk and away all winter. And further, I do not need to. My income is ample. The farm pays well, too. Last year I did not keep an exact account, but from first of April, 1890, to same date in 1891, we spent $1,865, and the farm footed the bill without help. That is good enough. As I carefully figured it then, this was fifteen per cent. net on investment, without counting berries from fruit garden, milk and potatoes used in the family, and use of horse and carriage. It is easy to tell from our cash account and bank account just what we pay out in a year, as cash or check is paid for everything. That $1,865 may seem a little large to you, but it includes everything. But, perhaps, we were not quite as extravagant as you may think, as $186 was paid for addition to covered barnyard, and $133 for painting all our buildings. We paid our regular man that season $155 and board, and hired some by the day; $54 went for tuition and books for our son at the academy, (he rides back and forth and boards at home). After taking out taxes, etc., our actual family expenses were that year about $1,200 in cash. Wife and I cannot help but think the farm is a pretty nice thing when it supports us like this. How can we help it? Wife's traveling expenses during the year were $65. She visited five different States, as well as Canada and Niagara Falls.

To obtain these results I worked myself less than one-third of the time on the farm, and for that I charged $400 in figuring the fifteen per cent. profit, and also charged for all labor done by the family, at fair prices. During four months of the time I did no work whatever on the farm, except to sow the clover seed. During the eight months, at least half the time, probably more, was spent in writing and recreation.

Instead of a run-down, wretched-looking farm, we have a little garden of Eden, as it seems to us, almost in perfect condition; so it is a pleasure to care for it. We have as fine a lawn about house and barn as any one need ask for, with plenty of trees and shrubs and flowers. But I think I will have to give you a plan of the house, and talk to you more about the conveniences and surroundings in another chapter, which we will call the farmer's home. We had to wait so long for a new home that we had plenty of time to plan it all out, and we think we have it about perfect, for our family and locality. A number of visitors have taken plans and built just such a house.

Not a word has been said yet about the greatest thing of all that we have done. Money is good and new buildings and furniture and fine tools and carriages, etc., but of what use are they if one has to work like a slave early and late, with almost no time to enjoy them? A friend who has been following my plan somewhat lately, but who used to keep dairy and do everything else, just as I started, wrote me not long ago that he had time now to renew his acquaintance with his wife, and he enjoyed it hugely. We have to work now, and work hard oftentimes, but it is far from the never-ending toil of our mixed farming days. We have the satisfaction now of doing the best we can, generally, and have a breathing spell now and then. Few business men can have as much time for enjoyment and recreation as we do.

But you will hardly understand this fully until I tell you the rest of the story. As we gradually worked into our special farming, we also worked out of some things, little by little and very carefully, as the pencil showed it paid, and without any regard to what folks said. Oh, yes! they called me a crank, often. But that is nothing. What is a crank? Why, one who thinks out new ways for himself—who gets out of the old beaten track a little. Nothing very bad about that! It was just what I was, anyway. I think the first crop we dropped as not paying us was oats. Then, when I got to garden farming, the chickens had to go. We simply can not afford to have them around on our farm and in barn and tool house and covered barnyard. They might be kept shut up, but we can make money easier and faster in our regular line. The poultry business is all right for some, but not for us. We can do better. But I hear some one say, "I want my fresh eggs and chickens to eat." Possibly we have more than any farmer in town who keeps hens! Then we gave up the corn crop when the cattle business was through with, and the pigs some one else bothers with for us now. I cannot afford to waste my time fussing. There is more money and less confinement in doing a good deal of one or two things, instead of a little of everything. For some twenty years we have only kept one cow, and used the milk and cream that we wanted and bought our butter. I cannot afford to wear my wife out fussing any more than myself. Butter making is a good business when managed as a business, but my wife is not agoing to go through all the motions and have the worry and care daily just for the income from a cow or two, or to save buying $50 or $60 worth a year. I can make the money far easier raising potatoes and wheat, with far less expenditure of the vital force of the firm. And you will notice this work was taken off from her shoulders among the first improved steps taken, when we were the hardest up, financially. Thousands of farmers' wives make butter from two or three cows at an expenditure of strength that is simply outrageous, in proportion to the income therefrom. Of course, some cannot buy good butter, and must make it. We can buy at the creameries here better butter than we could make in a small way. Some trouble to get it? No; wife and I try to take a ride most every night when it is pleasant, and it is no trouble to drive by the factory.

You see how we have worked, friends. We just cut down our farming to the three crops of clover, potatoes and wheat. That is enough to keep us busy, together with a large fruit garden, for family use, and the home grounds—as busy as we want to be. We did branch off a year or two and grow half an acre of strawberries, and set out a lot of grapes, etc. But we have pulled up the grapes, on account of frost injuring them so often. Within 25 miles is a locality where they are made a special crop to advantage, and we can buy the finest grown at low figures. We gave up the strawberries, not because there was no money in them, but partly because it put too much work on us at picking time to market and see to them. With our clover hay to make and potatoes to tend to, we have enough, and it is wiser to give our undivided attention to these. Why, I even pulled out the last of our old orchard a year ago. To raise nice fruit now one must spray and give great attention. Let such work be done by specialists, and then well and profitably done. I will tend to my specialty and buy my apples. By the way, the potatoes grown last year on the land where the old orchard was taken out (only a few trees) sold for enough to buy all the apples we can eat for three years, at least, and the best in Cleveland. And all apples around here were killed by frost last year, and year before, also. Should have had none if trees had been left. This chapter was written early in the season. Since then we have passed through an unfavorable year. I would not like to misrepresent in the least, so I say frankly that we could not spend $1,865 this year, and have the farm pay the bill. But we *could* live very nicely on our income from the farm in this one of the worst years we ever passed through. I think we could live as well as a man could in a large city on a salary of $2,000 who had to rent his home.

# CHAPTER VI.

## SPECIAL FARMING.

IN the first place, what do I mean by special farming? We will take a common meaning of the word special as found in the dictionary, namely, peculiar or uncommon. Special farming, then, we will call peculiar farming, or a kind different from the ordinary. This sort of farming is sometimes or, perhaps, generally, called specialty farming. I do not like the term as well as the one at the head of this chapter. Of course, I do not need to say that by special farming I do not mean the growing of one crop only. Any one knows that is not and never can be good farming. We must have a rotation for best results. We must grow crops enough for a good rotation, as a rule. Of course, there may be possible exceptions to this. For example, there are farms where it may be best to grow grass only —on bottomland subject to overflow or hillsides that wash badly. But under ordinary conditions on arable lands the rotation of crops is a matter no farmer can afford to overlook.

By special farming I mean undertaking to do less, so we may be able to do what we undertake thoroughly well. I mean growing what will do best on our soil, largely, making a business of it, rather than frittering away our time raising everything that will grow in our latitude, when some things pay much better than others. I mean buying something you want for your own use, if you will be ahead, by raising something your soil is particularly well adapted to, selling and standing the cost of exchange. I mean farming that is business-like and up to the times, and recognizes that father's way, although wise once, may be improved on with the different conditions that often exist now. I mean becoming an expert in two or three lines, rather than halfway knowing how to do everything.

It has been said that the way the great majority of farmers do in any section is undoubtedly the best way for that section; the opinion of many men is better than that of one. A mere schoolboy should know that this is not sound reasoning. It depends simply on whether the majority are right or not. They may be more apt to be right than one man, but they may also be entirely wrong. Let us illustrate this: Whole communities favored slavery; was it therefore right? In some places nearly every one uses intoxicating drinks; is it therefore the best way? I can take you to towns where nearly every farmer lets his liquid manure waste; it is therefore the best way, is it? There are old farms in some sections where the privy vaults and drainage from stables are sources of great danger to the health and even lives of the people through the well water. In these sections you may find here and there a "crank" who uses an earth closet, and allows no accumulations of filth about his place. He is all wrong, is he, and the mass right? Well-drained farms are the exception in some towns where the soil is heavy clay, and therefore tile draining is a bad practice, is it? I think you must agree with me that common practice does not prove any way to be necessarily the best. If all farmers were thoroughly up to the times and business-like in their methods it would be different. Then the judgment of many would be better always than that of one. It is not my desire to lay out any plan for any one else to follow or to urge you all to go into some special line of farming. All I wish to do in this chapter is to fairly set forth the claims and advantages of such farming, and meet some of the objections urged against it and set you to thinking, whether because you have always done a certain way, and, perhaps, your neighbors have, too, it is therefore necessarily the best way to keep on doing. That is all. All improved practices must be agitated before they are generally adopted.

We have farmers who think they must raise some wheat to make bread for the family, some oats to feed the horses, some corn for the pigs and cattle, some buckwheat for griddle cakes and maple syrup to eat on them; every variety of garden truck, and some hens and ducks and turkeys, perhaps, to scratch it up; all kinds of fruit, large and small; a little patch of potatoes, and a few acres of apple orchard, of course, and a small dairy, to say nothing of calves, colts and pigs. This is about what some of you are doing; yes. And why are you doing it? Why, just because you always have, and you have a string of arguments in favor of this way, learned by heart, and a longer string against any sort of special farming, and you rattle over these arguments just as your fathers did before the days of railroads and telegraphs. Well, no; you have changed some, but not as much as the times have. Your wives do not spin or weave much now, nor do they knit many stockings. Most of you have come into line on division of labor thus far. There are not so many carpet rags cut and sewed where the labor, perhaps, brings the tired housewife a cent an hour. You do not split out your own shingles, as you used to do. You haven't your bench and tools to make your own shoes, as many farmers had as long ago as I can remember. Some of you now do sell your wheat and buy your flour, instead of taking a grist to mill. You do not have your own clothes made at home by your wife any longer. Farmers used to build their own houses, of logs perhaps, and make and repair their own tools. Now carpenters build the houses—not one man, for it takes the mason, the tinner, the slater, perhaps, and the painter, as well as the worker of wood; every man to his trade. Little by little you are improving in this direction and feeling the value of one of the grandest improvements of the century—the division of labor. But have you carried the improvement as far as others? Have you carried it anything like as far as you might now with profit and pleasure to yourselves and with entire safety? I think not, and I would not for any money lead you one inch beyond the safe line. I was looking at a window in a farmhouse not long since, and the builder told me the lumber of which the sash and frame was made came from Michigan, the glass from Pittsburg, the sash was made in Cleveland, the mouldings and blinds in Cuyahoga Falls, the blind hinges in Buffalo, the sash fastenings in New Britain, Conn., the sash lifts and pull-down plates in Philadelphia, the nails came from Wheeling, the screws that the casings inside were put on with came from the Cleveland Screw Co., the sash weights from Akron, the cords to which they were attached from Connecticut, and the pulleys for these cords to run over from Buffalo, the green paint for blinds came from New York, and the paint on the window casings from Philadelphia. Each one of these things was made by a specialist cheaper and usually better than a farmer (or carpenter) could do it himself. And these manufacturers consume the products of the farm, carried cheaply now to all parts of the country, and thus make a market for specialists on the farm, so that, instead of four cents a pound for cheese here on the Western Reserve, we get two or three times that, and some forty cents, on the average, for potatoes, instead of six cents, as before the days of division of labor and markets and railroads. And why cannot we take advantage of special production to supply cheese and potatoes and many other products to the many consumers? It is an actual fact that men used to haul cheese from about where I live on the Reserve to the Ohio River, with ox teams, and think they did well if they got four cents a pound. And if they wanted a barrel of salt they had, perhaps, to go to Cleveland or Pittsburg for it. My good old neighbor and friend, A. Holcomb, now dead, has told me that when he first came here he drew once 40 bushels of potatoes eight miles to Cuyahoga Falls, and traded them for a hat, and it wasn't much of a hat, either. Another time he drew a load to the same place, and sold it for 6¼ cents a bushel. Those were the days when it was absolutely necessary for a man to grow about what he wanted for his own use of every product of the farm. Now nearly every product is readily sold for cash by those living in reach of railroads. No actual necessity exists any longer, in most localities in Ohio at least, for the farmer to continue to raise such a diversity of products on the ground that if he raises a surplus of one or two crops he cannot sell it, or that he cannot with the money buy everything that he may need.

Of course, the question of cost of exchange comes in here. One may by special farming be able to grow one or two crops cheaper than is generally done, but the middleman and railroads may take so large a slice out of his profits, both on what he sells and on what he buys, that he might produce, as to render the special farming unprofitable. If this is really and necessarily true, why, one better stick to the old way. But often what seems a very steep hill in the distance is easily gotten over when we actually get to it, or we may be able to find a good path around it. As for what I buy, I can get wholesale rates on most everything, as can any pushing, cash-down, business farmer. I can send to Akron for five barrels of flour, or to Cleveland for fifty bushels of oats, and when a notice comes through the post office that they are at the depot, it is little work to get them home; generally can be done when I go up town with some load. Neighbors bring eggs to my door for cash down, fresh and nice. I enjoy a trip to factory in the evening with my wife for butter. Practically I have no trouble at all in this line. But of course we are not all situated alike. This chapter is only suggestive, to rouse up thought. If you cannot do all I do, you may to advantage, perhaps, buy some one thing you are now raising. Study over it, think; but do not act unless you find it really wise for you. Perhaps you ask what if every one did as I, where would I buy my eggs, dressed pigs, etc.? Others might to the same advantage work specially in these directions, don't you see? Then they might be the gainers as well as I. But the exchange on sending a farmer's products to market is a far more serious question. The railroads in some sections do take too much; but we can find no fault with rates from where I live to points East and South, where we wish to ship. They are so low as to not interfere at all with special farming. We are so situated, or have so fixed it ourselves, that we can put a car of potatoes or wheat on the track at our station, two and one-half miles away, in a very few hours, and the freight to Boston or Philadelphia or other Eastern points is, if I remember correctly, but thirteen cents a bushel. Commission men must live, of course, if they handle our products, and if we cannot afford to pay them why we must not do this way. There is a tendency among farmers to call such men all dishonest; to talk as though they would cheat a man all they could. Now, I do not believe this. I do not believe they are any more dishonest than farmers, as a class. There are rascals on both sides. I stood in a commission man's store looking at a barrel of apples which he had just opened for me. The top layer was beautiful. I dug down a little and they were not half as good, and a little lower they were outrageously mean. Who packed those apples? A farmer, probably, and he will talk severely when he gets his account sales. Who is really to blame? Give commission men choice, straight goods, with your name and guarantee on every package and they may seem more honest. Perhaps you think by this time this book doesen't overflow with taffy for farmers. You can see I am not after your votes, at least! Well, a little sugar is good now and then, but good, sound, plain food is more important. On my farm the cost of exchange is so arranged as to be of little account all around. You must be the judge as to whether you can do as well. I think it needs a little more brains to manage successfully in this way. The farmer must be a little better business man. But this is just what the successful farmer of the future must be. The time has passed when any fool can be a farmer; when one not smart enough to do anything else can stay on the old farm. He won't stay long, in the future, any more than in any other business. One who farms in special lines must know first what his soil is best fitted for raising; next, where what he can best produce, is most wanted, and then send his products there, and where he can buy what he wants cheapest and then buy there. And he must have the cash capital to work with, as well as the ability to use it. Thank God, we have a good many such business farmers scattered through the country here and there, and they are worth their weight in gold as object lessons for less progressive brethren.

Why were the different parts of that window made in so many different places? Because manufacturers have found it profitable to give their attention to specialties. One makes sash and blinds, another screws, another glass. Each one finds it pays to give his whole attention to one industry, and become as skillful as possible at that. And there is more to learn about growing one single crop on the farm, oftentimes, than about making a single manufactured product which large firms give their whole attention to. All of us have noticed how skillful a person becomes who has had years of practice in any particular line. Did you ever watch an experienced lather drive nails? He will easily drive two or three to your one. Did you ever watch an old type-setter's fingers fly? Do you think you could write a good sermon as quickly as your minister could? How long do you suppose it took me to write the first article I ever wrote for a paper? Just one week, solid. If in a hurry, I might do better now in two hours. Practice makes perfect and gives experience. When I built my new house a friend in the city prevailed on me to hire an experienced hand from Cleveland to come and lay all the carpets, which were mostly new and made in the city. He came and put them down, perfectly, in seven rooms, mostly large ones, one bay window, one hall and winding stairway, and oil-cloth in the pantry, and put up the fixtures, and hung lace curtains on four windows, all in just five hours. He had done nothing else for ten years, and could easily do the work better than I, and four times as fast. Now, would it not be singular if the farmer who gives his whole attention to two or three crops could not become more skillful in the raising, managing and marketing of those crops than he could if he had a dozen different ones to attend to? There is too much to learn now about any crop for one man's head to be thoroughly up to the times on everything, and there are more difficulties yet in the way of putting his knowledge into practice when it is very much diversified.

The distinction made by some writers between mixed and special farming is that in the former some kind of animal keeping is united with the growing of crops. I would hardly look at it in this way. A dairyman might make a specialty of the production of milk or butter and grow a rotation of clover, corn (ensilage) and wheat, the first two to feed his cows, and the last crop to seed with and furnish straw for bedding. If he attempted no more, but stopped right there with this necessary rotation, I should consider him not only a wise farmer, but a special one—one doing differently from the ordinary way. One may keep hogs and raise clover, corn and wheat, or sheep and raise largely grass, and not be what I would call a mixed or diversified farmer, as the term is usually considered to mean.

I live in a dairy section, one of the best in the country, perhaps; but nothing can be more true than that, on the average, these cows do not produce more than half as much as they might easily be made to. Now, I fully believe—yes, I know—that to push these dairies up to the other half would pay far better than using part of one's time to push some other industry on the farm not at all connected necessarily with dairying. Thousands try to do both of these things, but they do not, as a rule, and never can succeed. The first $30 from a cow has little profit in it; the next $30, where the conditions were right for the business, might be made to show a very large profit—in fact, an enormous percentage of gain. But, instead of working for that last $30 and the big profit, the mass work at something else in which there is no profit, because it is only pushed up half way. You may work at a dozen things, and only carry them up to the average, and they will just barely (sometimes not hardly) pay cost of production. You may take one or two lines, and push them to the top, and realize 50 or even 100 per cent. net profit. I can take you right to farmers who are doing this. You cannot do it if you spread too much. Of course, the mere dropping off of some crops will not of itself help one. It simply gives a man of push and determination a better chance to help himself, just as does tile draining where needed. Would that all could plainly see this matter of the difference between income and profit from the farm. I may get a thousand dollars from a number of sources—different crops sold, animals, etc., and not have one cent of actual net profit in any single thing sold. This is depression in agriculture. It is what plenty are doing. But you can find men raising the same crops, or keeping the same line of stock that receive the same amount—$1,000—and can show hundreds of dollars clear net profit. This is business farming, and the special farmer has the best chance to make this showing.

Aside from the profit in this kind of farming, a man ought to enjoy it more to do his best in some particular line, and become an expert therein, and to have his number of worries reduced. When the wheat wants cutting, and the clover is getting too ripe, and the bugs are destroying the potatoes, and the weeds racing with the corn, and the dairy must be milked night and morning, and lots of other things to do, it isn't pleasant to be a farmer any way one can look at it. With less crops there is less chance of getting in this fix, and more money from the others better cared for. Many a mixed farmer who was in the above fix has bought his potatoes of me in the fall, after planting a lot in the spring, when we have had a bad season.

The great argument urged against special farming is that one has his eggs all in a single basket. This is seldom exactly true. For example, I sell wheat and potatoes, and the wheat often brings $400 or more; but practically the main income comes from one source; let it go as one basket, if you choose. Advocates of mixed farming say that if one crop fails, or more, something will be sure to succeed where one has a number of sources of income. Well, now, my friends, this feeling is just what *lets* many crops fail. This is altogether too weak. It isn't taking very much of the "Dominion" that the Creator gave to man. When crops fail in a region as favored as I live in, about nine times out of ten man is to blame for it in some way or other. He may call it luck, but it isn't very often. He has not done his part fully. Perhaps he could not; he had so much to do, or he had not funds to do with; but that does not alter the fact. Perhaps he was so driven with his multitudinous cares that he had little time to think out the best ways, didn't know how best to do; has worked with his hands at a dollar a day too much, when a little good head-work would put him on the track of getting five dollars. I did this once. What is the sense of putting in crops, furnishing the seed and use of land, and then making nothing out of them? If the crop is not reasonably safe on your soil, why grow it? Why not grow what is safe, or, if it isn't safe, fix it so it will be? Of course, luck has a little to do with success, but pluck has a mighty sight more. What were you given brains for but to overcome obstacles. Such work makes men. Before you get through these pages you may find the particulars about many ways in which a man can make a single basket or two strong enough to trust all his eggs in, and get rid of doing so much work for nothing putting in luck crops. I speak pretty positively friends, because I have been there. I have never had a failure of clover (seeding or crop) in twenty-three years. I have never grown a crop of wheat that did not pay a good profit, and the average has been very high. I have never had a failure of potatoes, nor anything near it. I would not be boastful, but man can do almost anything. The gilt edge will be taken off of a crop often, in spite of us, but then it may be twice the average still, and pay grandly. But I would not be unmindful that some are not as favorably situated as regards climate, etc., but still there is hardly any section in which you cannot find some good crops every year. Make the conditions on your farm the same, and you can succeed, too. Mixed farming failed, all the eggs and all the baskets, on this farm for years before I came here. Who changed the conditions so that special farming has never failed? It was not luck. Oh! this world is running over full of ordinary workmen in every line. Climb up; become an expert in something and not be crowded any more.

Frankly, I have always expected, sooner or later, to have a bad failure of one of our crops from some cause we could not prevent, such as rust on wheat or the potato rot. We have, of course, done everything we could to ward off such troubles, but probably will get caught some time. But I think we could weather one failure, and not suffer much. I have been fearing that potato scab might drive us out of potato growing, but it looks as though man was agoing to be able to manage even that soon now. Whatever we have to do, we shall never go back to a little of everything. I know it is hard for some farmers to pay out any money for what they could produce themselves. They are not to be blamed for this. Their money comes hard, and the tendency this way has been more or less inherited for generations. But one should learn to overcome this feeling, if it will be for his advantage. I was fortunate in never having it to overcome, having been born in town. It is just as easy for me to buy a basket of eggs or a dressed pig or a barrel of flour as it is a keg of nails or a new chair. When I know that I can make from 50 to 200 per cent. net profit raising potatoes and wheat, and this work furnishes me steady employment for my man and as much as I care to do, it doesn't bother me at all to buy oats, which I could not begin to make as much on. Some will say, "Yes; but I can do both, and that is better yet." Perhaps, if you do all work as well as it can be done, and are not overworked. But beware, lest you carry it too far, and lose more than you make. Mr. A. I. Root once asked the opinion of Professor Cook, of Michigan Agricultural College, about my special farming. His reply was that he would agree to it thus far, that one should not undertake any more than he could do thoroughly well. That is all I am arguing for, if by thoroughly well we are to understand about double the average yields under ordinary methods, and that farmers and their families and men and teams shall not be overworked.

Perhaps you think the particular crop I raised mostly had much to do with my success. I think not, only that it was the proper crop for my soil and market and small farm. Some lines of farming would require much more land, but there is about as little money in an average crop of potatoes as in an average one of wheat, or an average income from the dairy—no particular profit in any of them. Potatoes pay well when you get two or two and one-half times the average yield, and the cost of production is brought to the lowest notch that a specialist can; but so does wheat or corn or the dairy. I can tell you of men who make 100 per cent. net in these lines, with the exception of the wheat.

Of course, you know the old argument in favor of special farming, that one can have all the tools and conveniences for reducing cost of production. With three or four cows and common appliances can you make as good butter every time and as easily, that is for as few cents per pound, as the man who has a large dairy and all modern implements and conveniences? Do you think you can raise and handle two or three acres of potatoes each year as cheaply as I can a dozen? I have tools, you know, to plant, dig, harrow, etc., so as to save a great deal of hand labor. But you will hear more about them in another chapter.

Concentrated effort in science, in manufacturing, in merchandising—everywhere else has brought great success, and to a certain extent it will make farming more profitable and more pleasant. You must be the judges to what extent you can wisely go. It is for me but to suggest and set you to thinking.

# CHAPTER VII.

## CLEARING OF TREES, STUMPS AND STONES.

REMEMBER there were only about 35 acres on my farm that were reasonably suitable for tillage. Of these about 10 had timber on when I came here. It was not thick, heavy timber, but rather scattering. The best had been sold out. I thought I could hardly do anything worth while on less than all of this land, and so decided to get rid of the timber. When I talked with some meighbors about it they said they would not think of cutting off that timber. "Why what would a farm be without a wood lot, or somewhere to go and get some logs when lumber is wanted?" Everyone advised strongly against my plan. "What will you do for wood?" says one. "You never can sell your farm without timber," says another. Well, after getting all their advice I thought and figured a little for myself,—no, not a little, but a good deal. I did not want to do an unwise thing, and financially I could not afford to make the slightest mistake. I did not figure out as good results as actually came, but they were good enough, so I began on the clearing. Of course, I could not do it all at once, without capital, but had my plans laid and worked to them as fast as possible. Some told me that it wasn't right for a man to cut off all his timber; that every one ought, for the public good (to break the wind, increase the rainfall etc.), to keep some timber on his farm. It seemed to me that when the State became satisfied that such a course was necessary for the benefit of the public, she might pay for it. An individual certainly had a moral right as well as a legal one to manage the matter for his individual interest. How otherwise could each bear his just share of the burden, unless it was controlled in some way by law and inducements offered to land owners to keep such a percentage of their farms covered with timber? But does cutting off the timber really have anything to do with decreasing rainfall or changing temperature?

I have before me a carefully prepared paper by Prof. I. O. Baker, using data collected by the Smithsonian Institute of Washington, D. C., representing in the aggregate 249 years of observations. This paper shows conclusively that we have had very dry periods and very wet ones, nor is it possible to trace the cause to the clearing of the land or draining, not in the least. For example, from 1832 to 1844 the rain-fall was below the average in the wide expanse of territory where record was kept.

About 1837, says Prof. Baker, would have been a good time for some one to have demonstrated that the rainfall had permanently decreased. But from 1844 to 1864 the rainfall was above the average. Observations on the weather, says Prof. Baker, when carried on sufficiently long to eliminate temporary variations, appear to conclusively establish the fact that no essential features of climate, so far as increase or decrease in the yearly amount of rain or the temperature is concerned, have taken place in historic times.

I might say here that I turned my wood into money at higher prices than it is worth now, and the same of my oak timber, what there was of it. With all the cry about "What will you do for wood and lumber, it will soon be so scarce?" it is cheaper to-day than ever, and, better, we are burning something far nicer than wood to keep warm by—anthracite coal. There is no trouble in buying good hardwood, cut and piled in the woods, at $1 a surface cord, eighteen inches long. This is all I have paid, cash down, for years. We burn wood in our cook-stove. I never sold any hardwood as low as this. When I want any lumber I go to the mill and buy it, or send to Cleveland and get it for less than I sold mine for, and just what I want—no more or less. And meanwhile I have had the money to use, when I most needed it, and have got my land bringing me a large interest, instead of little more than paying taxes by the growth of timber. I hardly know how we could have got along without the money from the wood, little as it was. I rigged to draw a big load easily, as I will tell you about in another chapter, and so made my work count. I drew it myself nearly always. Many a time have I drawn four big loads in a day, two and a half miles. The pay for timber and teaming, after taking out price paid for cutting wood, was usually about $2 a load. But haven't you seen folks cut and draw wood so they didn't make a cent? I have. But more about that later on. Have you any idea how a boy without money could get the wood cut? Let me tell you just one little transaction to give a hint as to the ways we had to manage. A neighbor had a horse he wanted to sell. She was a good animal except that she had a spavin that made her a little lame. But for this she would have quickly brougnt $100. I found a man without credit or money that wanted this mare. He agreed to cut wood for me to pay for her and let me keep her till the work was done. I had credit but no money. So I bought the mare for $50, giving my note for eight months, I think, without interest. The woodcutter paid me for keeping her, and cut the wood in due time and got his horse. I sold the wood before the note was due and paid it, and must have had some sixty-six dollars left for timber and drawing. This is but one of the many ways we worked to get that land cleared and ready for the tillage we had planned. Meanwhile we were making something on every move.

When the timber was finally all off, the land was used for pasture for four or five years, while waiting for the small stumps to rot out and the smaller roots on the larger ones to decay so they could be taken out more readily. Our land naturally comes into blue grass, and this soon became good pasture. During these years, whenever there was a day to spare, or a wet time prevented our doing other work, we were down there piling or burning the logs and such stumps as would come out. There were many old ones, as much timber had been cut previously, and there were a great many logs, as in the early days they only used the best of the timber and left much on the ground. A great deal of work was done on this lot, but the cost as we managed was practically nothing. At last we thought the time had come to strike. Along in August I had two good men by the month, and we had two weeks of very wet weather, when we could not work at our other farm work, and we began cleaning out these stumps in earnest. We made such headway that I was encouraged to try and finish the piece that winter, ready for the plow the next year. A young man of great strength had been at work for me for some months, and was very anxious to stay all winter. He wanted me to undertake the job and keep him, and he offered to work a year for a price not very much in advance of what he could get for eight months. This was a new departure for us, but we dared to go into it. One writer sneered at us in the papers in regard to this transaction, as cheating the poor hired man, or getting work out him for little or nothing. But he should remember that we were very poor and did not know how our venture would come out, and the young man desired to stay and have a home through the winter, and further, that before he left us finally, and after we were more on our feet, that we made him a present of $75 in cash, beside paying him what he had gladly agreed to work for that year—$25 a month and board, if I remember correctly. Many a time have wife and I said to each other that if we ever had anything of our own we wanted to feel that we had not wronged anyone else, particularly our men, in order to get it. In the matter of prices paid for labor, we have usually got good men only, and paid them rather more than they could get elsewhere, purposely, and kept the matter still so it would not make trouble with the hired men of neighbors.

Well, this strong young man, who just loved real hard work, began on the stumps as soon as the fall work was over. We got out the smaller ones first. They came easy and fast, being pretty well rotted. They were mostly beech. The large oaks were in very different shape. Around them, during the early winter, we dug out the earth, exposing the roots, and then my man chopped these roots off. At the outer end they were cut far enough off so what was left would be entirely below the plow. Then they were cut as closely under the stump as possible. After this process was finished they still were fastened under the centre. Next, when a very cold, windy day came, we drew the small stumps and roots up around these large ones and burned in under them all we could. We did this some days when it was down near zero. When a number were ready I would get a team, and by twisting and chopping we would work them out, using a strong lever and chain for twisting, and hitching the team to it. Sometimes Fred would cut them clear off beforehand. Now, I tell you this was solid, hard chopping. I think we wore out two or three axes, nearly all on the lower point, of course. There were a few of the worst stumps that it took Fred a day or more to conquer. It is possible that now these might be blown out with some explosive cheaper; but I am not certain. They were very large, bad stumps. And where I have seen stumps blown out, there was such a great hole made and so many more roots brought out to handle. When we got a stump out it took but a short time to shovel the earth back and much of the weight of the stump was left in the ground, too low down to do harm, and these roots as they rot will do actual good in the way of drainage. At any rate, this is the way we got them out. The earth was cleared away from stumps in open weather, so we had plenty to chop when it was cold and frozen too hard to dig. I say "we," but my man, Fred Ross, handled the axe mostly. I never could have done it. But I engineered it. I have never been able to do long-continued, heavy work myself. Well, we got *every* stump out, a good many hundred of them. In the spring we cleared up the field, picking up roots and chips, load after load of them. My wife and little girls worked there day after day, for we all pulled together to carry the thing through. There was more than the mere dollars in it, too, you see. It was a question of whether my judgment was better than that of some old neighbors'—whether I was a "town farmer," or had a level head. I was going entirely contrary to public opinion, putting money into improving my farm, or my work either, for that matter. One good neighbor told my man, when he went by, that I was entirely crazy, that I wouldn't get my pay for that job in twenty-five years, and actually worked on my man's feelings so that he came to me and said he did not want to stay and do the work if I was agoing to lose by it, and was doing it just to give him something to do (the honest fellow). I told him to go on. He would get his pay, and I thought I knew what I was about; and I believe, friends, he enjoyed the final triumph just as much as I did. One neighbor, when passing and seeing the great stumps standing around after they were out, says to my man: "What are you going to do with them after you get them out?" Quicker than a flash, my man replied, "Eat them—what do you suppose?" You will now have an idea of the general feeling on the subject. By the way, the friend who said I would not get my pay in twenty-five years was the one who told me not to hire any help regularly when I began. Then his advice was sound. At this time, however, I was getting into shape to employ labor to advantage, like other business men.

Well, the first crop put in was Hungarian grass; of course, it was roughly done, but we got 20 tons of nice hay (not a full crop), which, fed out in the barn, brought us that winter $200. In the fall, after the Hungarian was off, we sowed wheat, and the 10 acres yielded 380 bushels. It was sold at the mill in Akron for $1.50 a bushel, which, with the straw (an immense growth—fed out in the barn, at about $4 a ton), brought us the nice little sum of about $650. Then came our turn to laugh. The clear net profit on that wheat crop, after taking out the cost of all labor and seed, and allowing $5 an acre for fertility removed from the soil, which is excessive, and $6 an acre for use of land, which was also high, and $2 an acre for drawing to Akron; the clear net profit, after taking all this out, was $357. Did it pay to spend $200 to clear that land? I got the $200 back on that one crop, and $157 besides, while the land that would hardly pay 6 per cent. interest on a valuation of $40 an acre, by spending $30 an acre on it (part in underdraining) paid this year in wheat a net 51 per cent. on a valuation of $70 (old valuation and cost of clearing and underdraining added). As nearly as I could figure, the actual cost to me of grubbing those stumps alone was $12 an acre, but, with the picking up and burning and team work, etc., the entire cost was about $20 an acre.

By the way, a man came along when we were beginning the job, and wanted to pull the stumps with a machine, at $8 an acre, I think. I told him he might try. He brought one of the lever machines that were in use at that time, which, it was said, would pull anything. He put on two teams, and then could not pull the worst stumps, and when he did get one out it left an awful hole. He managed to pull the machine, which originally cost some $500, all to pieces, without making much show with the stumps. Still, I have seen good work done with the same tool on land where tree roots spread out over the surface more. Ours mostly ran down deeply.

We have got a good deal of money from that 10 acres since clearing it. It was a wise move for us, and done at just the right time. I think before this time we had got every stump out of the old cleared land, and there were a host of them. But they were so old that it was not a serious job to tip them over. Here the stump machine would have done nicely, if we had had it. When thus clearing up the land ready for tillage, I left here and there a tree for looks and shade. But, in after years, I saw that this was unbusinesslike, and every last one of them was taken out of the 35 acres we cultivate. They would look well, I will admit, as far as the landscape is concerned, but they were weeds, and big ones, too, when we come to consider the interests of the crops. It did not look businesslike to have a break in the crop, and quite a large one, too. And there were trees enough, thousands in every direction, to look at, and shade is not necessary in the fields on our little farm. The beauty of a perfect, even, uniform crop, from end to end, is as fine, in its way, as an extra tree or two in the landscape, and then it brings more dollars, and they can buy as beautiful things to put in our home, that we can look at and enjoy every day in the year, I argued. But you shall judge. The last and far most costly tree to get out was a wide-spreading maple. I would give $100 in a minute now for it, if standing just where I wanted it, and, perhaps, would then. But it was near the middle of a little field, and on our very choicest land. The land spoiled by shade and roots amounted to four rods square, or one-tenth of an acre. The first year after it was taken out the land was planted with Hubbard squashes, and the squashes that grew on that one-tenth of an acre, taken from the field direct to market, brought us at wholesale, by the ton, $24. Putting a few more dollars with this, I got in Grand Rapids, Mich., the finest ash bedroom set made in that noted furniture town, and it stands in our room, a comfort and a beautiful thing to look at every day in the year. The tree was only beautiful part of the time, and we have others fast growing up where they are equally beautiful to look at, and do not spoil the beauty and uniformity of any crop, nor lessen the profits of farming. We never pasture our fields that we cultivate, you know. The loss in crops might be made good by comfort of animals where fields are pastured. We have shade in our permanent pasture, I assure you. It took about $5 worth of labor to get that big maple tree out, root and branch—a pretty heavy bill,—but we *made* it pay tremendously. We decided our land must be *entirely* clear from all obstructions, and whenever we invested any money, or labor, which was just the same thing, as it cost money, we arranged to get it back quickly, with large interest. This is the way one must do in all directions to make improved farming pay. Clearing and underdraining and a silo, etc., must be followed up, and *made* to shell out the profit. But all our tree clearing did not pay quite as well as in the instance given. This was an extreme profit, as was also the cost of getting out the tree itself. But do not forget this one point: We decided on what was businesslike and, theoretically, should pay, and then just forced our new departures to pan out.

You might like to know how we got out those trees. It is best done in the early spring when the ground is very wet, but, of course, you would not want water to stand in the hole when you was digging around the tree. After digging and cutting the outside roots off, rather further from the stump than we did when getting stumps out, I got all the chains we had, and borrowed from neighbors, and fastened one end near top of tree and put a team on the other end. With plenty of chain and a team that was used to pulling, one has a chance to turn over a pretty large tree without much grubbing. With rope and pulley blocks one could do better, but this is the way I did, and I have pulled a good many for myself and others. The team should not pull steady, but spring to it with all their might, with slack chain, and then let up and try again. Of course, you must have chain enough to have team out of the way of the tree when it falls. One can get the stump out very much easier with the tree on it as a lever. I have pulled a good many old apple trees in this way, acres of them, and we took them out almost as quickly as one could cut them down, and then the job was thoroughly done, once for all. No stumps are left in the way to bother for years. The majority of farmers around here cut down an old orchard. How much better to turn them out by the roots! Two men and a team can get out a good number in a day, when the ground is soft. After the trees are over they can be cut up for wood and the brush burned right there, after drying a little, and the stumps drawn away on a stone boat. I have moved some that it took four horses to handle. After they get dry they can be burned, when piled with other rubbish. I have shoveled up the ashes where such a pile was burned into a wagon and spread them on my land, where I thought they were most needed. They would certainly do more good than if left all in a heap. And I tell you we have burned a great many heaps.

A part of our land was quite free from stones, but on some parts there were many tons of small ones, with here and there big bowlders too large to handle. I never did much plowing around these big fellows after I could possibly spare the money to pay a man for sinking them; and I found it the easiest way to get rid of anything that two men could not readily roll out on a boat, to dig a hole by one side and just a little under it and then pry it into its grave. One needs to be sure that the hole is large and deep enough to have the top down say a foot deep after it is buried. Well do I remember the first work of this kind I did. I can take you right to the spot now. It was a terribly hot day and I worked hard with my man and got the hole ready and worked the stone in. I had not calculated rightly and it was little lower than before. After doing that job all over I learned to measure and estimate very carefully. When the ground is soft in the spring a strong man will dig holes for quite a number of ordinary rocks in a day. The worst one I ever sank was for a town friend. A good man spent a day digging a regular cistern by the side of the stone and as much under it as was safe. I did not know how on earth we were ever going to move the stone. It would weigh several tons, and I thought probably we could only get it out of its bed with powder. We left it at night all ready for moving, and it so happened that we had a very heavy rain before we went back to the field, and then we found the stone in the hole all right. The rain softened its bed, so it slid in. There were a good many small bowlders in my land just under the surface. The plow would strike them. As soon as I could afford it to have help, I had an old boot tied to my plow handle, full of little sticks about a foot long, and when I came to a stone of this kind that the plow did not bring up, I put a stake right over it and went on. My man followed with spade and bar, and either took it out or sunk it, according to size. The little stones were picked up. Oh! how many, many loads of them! This was a crop that for a time never failed on some of our land. We picked up everything down to the size of an egg or even less. When we would get the top clean, then we would plow deeper next time to deepen our soil, which had been worked very shallow before we came here, and then have another crop of stones. And we have done this several times. No wonder a young friend, writing me about getting rid of stones the other day, asks the question whether stones grow! I guess not, but they probably work up some by frost and certainly do by deeper plowing.

The stones I picked up were drawn into the permanent pasture and put in piles on waste land. A neighbor, S. P. Thompson, dumped his over a bank and then scraped earth over them. This is an excellent way where the lay of the land is right for it. They are put out of sight and out of the way, once for all. If you ever have any notion of using a subsoil plow you must sink your bowlders deeper than just below where the common plow will run. I thought when I buried mine that they were out of my way forever, and then I got the subsoiling craze and came up all standing against those buried pets now and then. One must do lots of thinking ahead to get everything just right. I would advise that you do your tile draining before burying hardheads, or they may come in your way. Of course, one can dig and lay around them, but it causes extra trouble. I am in the habit of picking up small stones when we are rolling and drawing them off on the roller. We have had a large one that would hold a ton. I think, perhaps, these small stones would be an advantage to the soil and crop, but then we cannot use the finest implements among stones to advantage, nor can we go along at a rapid pace without danger of breakage. Such tools as the potato digger, Thomas harrow and Breed's weeder cannot be used to the best advantage, except on clean land. Nor can one do a nice job of plowing among stones. You may back up all you please, but if the plow is thrown out you cannot do as perfect plowing. Although not quite so important, perhaps, as getting out stumps and trees on our farm, it lies in the same line, and we never stopped our efforts until we got our land clean and free from every obstruction, above ground or in it, that would hinder the fastest work that is practicable and the best work with the finest tools in existence. How much more work it was to do all this than to write about it! But poor as we were we worked it out in time and now it is a delight to farm our land.

# CHAPTER VIII.

## LAYING OUT THE FARM.

AT the very first we attempted to farm as much of the cleared land as we could get over. There was no system or thought put into the matter at first. We had no time for this. We did about as others did, and worked early and late and hard. But when we were driven by necessity to make more in some way or go under, and after the pencil had been used enough so we had some little insight into the difference between income and profit, and into what was paying us, then a different and systematic plan was laid out and followed. We selected out about five acres in one lot and two in another that were naturally pretty good and about all good and underdrained by nature. On those acres we used all our manure and put in about all our time. Now, here was a chance to do something in a small way. We could handle this much land and do it well. There was no money needed to drain it and it was pretty well cleared of obstructions. What stumps there were we got out and picked up the stones. We made really a little garden of these few acres. They were made to pay a large profit. Of course, the income was not great from so few acres, but the pencil showed good pay for the labor put on and a fine net profit. This was encouraging. The rest of the land was simply left to do what it would in the way of pasture, and it was mighty little it did. People used to ask me in those days, "Why don't you plow that other land and do something with it?" I couldn't make it pay. It was far better when I had a few days to spare to go and draw gravel for the town, or do some other job of teaming, where I could make $3.50 a day. I couldn't do this raising a poor crop. Of the five acres first thoroughly farmed, it was said, and truly, "Terry supports his family from that little patch." Yes, and he paid some interest, too.

Now, you can all see what this would naturally lead to—the taking in more land into the little garden farm. Next, we fenced off another small patch that did not need drainage and soon made that pay grandly, too. And then, as we got more money and confidence (from actual figures and results), we would move the fences back and take in a little more land, and do a little more clearing of stumps, etc., and draining wet land. We avoided the wet land all we possibly could at first; not that I did not have entire confidence in tile draining, but because there was no money to buy tiles and pay for labor. I had had my 12 acres near town that I traded for the farm well tile-drained when living on it, and knew the results, and knew practically, from watching the work of a real expert from England, something about laying the tiles.

Now, of course, during these days, we paid no attention to the shape of these fields. We took the good land in the shape we found it. This was working at a disadvantage; we could not accomplish as much in a given time as if the fields had been better arranged. But we were obliged to improve little by little. I doubt, however, whether I thought anything about this at first. I began just as others had always done on this farm. When they cut the first timber, or "deadened" a piece, they looked around and found three or four acres in a body that seemed to be dry and pretty good soil and cleared it for tillage. It made no difference what shape it was in. Then they fenced this. Afterwards they cleared another patch in the same way and fenced it, and so on. And to the day I came here the farm had been worked in just that way—in little patches here and there, no matter whether in good shape for fast tillage or not. This, together with swales cutting diagonally across lots, and cat swamps here and there, and part clay land that needed tile drainage, made the prospect poor enough for a young, green farmer without money. While I think of it, I will say that the big manure piles we made from keeping so many cattle winters went onto these few acres that we began on largely. And more than this, the manure put onto the five acres was nearly all put onto the front half, the back half of lot being treated from the very start with clover. This was not purposely done at first, but was a mere accident, and a lucky accident it was, too. I speak of this here because then you can understand better how it was when I come to write about clover in future chapters. Some writers have thought that I made my land rich with manure from these cattle. This was a natural conclusion, I made some few acres rich with manure. That is true. I made many more very productive, at least, with clover. I tell only what I have done and what I know. In my prize report, written some ten years ago, I said, hastily, in a foot note: "We put about $40 worth of home-made manure on each acre for potatoes, etc." It needs to be explained that we had only fairly began at this at that time, and soon quit keeping so many animals, and, further, that that $40 worth of manure was more than half muck, which the State chemist valued far more highly than practical experience proved to be true, and I was then depending on the chemist, as will be explained in another place.

The time finally came when we went at it and completely rearranged the whole farm in as businesslike shape as was possible from the lay of the land. We had been working towards this systematically for some time before by clearing and draining at odd spells. We turned out for nothing, but made everything come into line. Swales that men had gone around for forty years had to give up their existence when the onward march began. Ditto cat swamps that old settlers had slashed the timber standing near into. Ditto stumps, clay spots, springy places, etc., etc. Some of these things died hard, but die they had to that we might live. I hardly need to tell you that we arranged the land so as to give us long rows, as far as was possible. Let me illustrate the change a little: The two acres mentioned above that we first cultivated well were right along the road which runs nearly east and west. They were on the south side, and in a strip about eight rods by forty, with the barn and barnyard cutting into the centre, nearly dividing the strip into two pieces. But this was naturally drained land, and we had to use it at first where we could find it. When we brought the old farm into line we had seventeen and a half acres of clear drained land in a body, with the rows mostly sixty rods long and running north and south. This, worked in three strips (no inside fences, of course), made the three lots numbered 4, 5 and 6, the crops on which are given in another chapter. Now, in the front part of each of these three lots, although mostly in the first two, there was some of that original little garden farm that we manured so heavily, sometimes putting on forty loads per acre. The rest of the lots were never thus manured, but were largely brought up by the tile drainage where needed, and then tillage and clover. These are the facts, and you can now see plainly how I came by accident to have such a nice chance to see whether clover would bring the rest of the field up to where heavy manuring had brought a small part, and you must certainly say that I have a better chance to know the exact truth about this than any other living man. Now, we will drop the clover and manure question until they come up regularly. They were only brought in here because I could best explain this one point as I was showing the evolution of fields.

It would seem as though one hardly need to say anything in favor of long fields. It is so self-evident that one can do nearly all farm work faster than where he has to turn around more, and thus waste time, that it seems almost too simple a matter to take up space with. And still, in many sections, men *do* not get their farms into shape. This is particularly the case where the soil is variable, and there are many cat swamps, swales, etc., as we have around here. In laying out our land, there was one little corner containing an acre and a half that was nearly square. This, of course, is a bad little piece for tillage. But we had none too much available land, and this was naturally dry, and we disliked to leave it out in the pasture that we afterwards sold. So it was taken in, and forms part of the seventeen-and-a-half-acre field above spoken of. Most of the rows in the lot are sixty rods long; those in this corner are about one-third as long. When I was planting potatoes the other day I worked pretty steadily to plant that one and a half acres in a little less than five hours. I can plant two and a quarter acres in the same time in the rest of the field. It is a big day's work to plow that corner; in fact, it is seldom done in a day, although I have done it in that time myself. The same time in the long field will easily plow two and a quarter acres, and I do not think it is any harder on the team. They do more work, but there is less worry. I know I had rather plow all day on the long rows than the short ones, although I would walk some miles further. But time is money to me. There is always enough to do on my farm. I must hire much done and pay cash. It is simply a matter of business to arrange so we can accomplish as much as possible when we work. When cultivating I never had a man who would not go over six to seven acres in a day of our narrow rows (thirty-two inches wide), and do it well where the rows were long. And this is done always in ten hours or less. When I send a man over to that corner to cultivate, he never gets back as soon as I expect, although I know the shortness of the rows. It is an awful place to kill time. Too much time wasted in turning. Too much standing still and too little going ahead. And now, friends, do you not know that there are thousands of hard-up farmers who plow up little patches here and there, very likely square, who waste lots of time (money) just as I do in that corner, who might bring things around into better shape just as we did, if they would really set about it determinedly? You say, "Oh, this is a small matter!" Yes, and so is a cent, but plenty of them will make you rich. Success is made up of careful attention to details. If you can save a little here and a little there in the cost of production, and increase the yield in several ways also, why, you may soon be well-to-do. Do not despise the smallest matter that is businesslike. Of course, one can be lazy with long rows, but they give the pushing man a better chance. And it may be more than the actual time saved in doing the work. Can you ever do as well as you want to by everything? Do not you often see where a little labor would be of great value if you could have it right now? The quicker you can do your big jobs the more chance for this. I have been trying for years to get a friend of mine, who has some little children, to set out some strawberries. I know how much he likes them, and the wife and children, too. I know he is not able to buy them. I know that he wastes time enough on one field of short rows that he cultivates to take care of a strawberry bed (if the work was done in time, with long rows, and mostly with a horse) that would give them fifteen bushels of berries to eat every year.

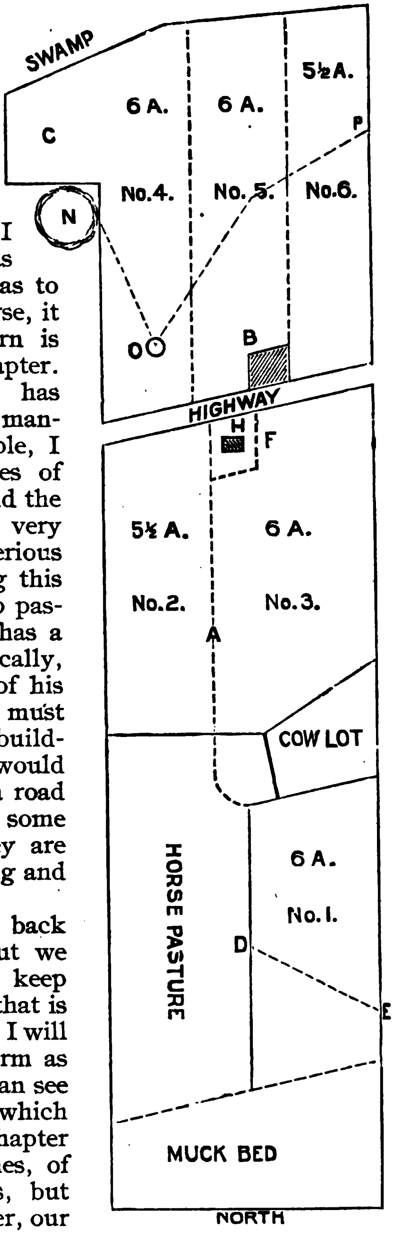
Secretary Bonham, of our State Board of Agriculture, told me once that in a large, long corn field that he had, it took 50 per cent. longer to cultivate crosswise than lengthwise. Yes; that is short rows again. Cultivate the long way always. No need of cross-cultivation any more, with the tools we now have. The only time when I am bothered at all with my long strips—about 16 rods by 60—is when it becomes necessary to cross-harrow. But we manage so as to not do this very often.

You talk about competition with the large farmers of the West, who have great fields, being too much for you; that it is driving you to the wall! Well, it is driving old methods to the wall, true enough. You cannot do as you once could, before the West was settled up, and make money any longer, not as a rule. You can manage so that competition will not prevent a grand success. Lots of men here and there have done this, and you know it. Are you not as smart? Wake up! A little farmer even can make his rows long, too, which is part of the advantage of a big field.

When the writer had something to say on this point at an institute in Maine last winter, where he thought he saw need for some improvement in this line, for less little-patch farming, one farmer answered: "Oh! but that means more work and more help, which we cannot afford to hire. We want to know how to make money; not to spend it." Alas, that it is so, but there is a withholding that tendeth to poverty. You may get poorer and poorer trying to work clay land till you tile drain it. Your building may rot down if you do not pay out a little for paint. I never made any money on the do-what-you-can-yourself-and-let-the-rest-go principle. The more help the better, if kept profitably employed. I am aware that sometimes one cannot, for some good reason, get his fields into real good shape. I cannot get mine just as I would like them, but they are very much better than they were. Do the best you can, friends, that is all, and as fast as you can. Look around, and think a good deal. Perhaps you can do better than you now think. There is almost always a way where there is a determined will. Men who owned my farm years ago doubtless thought they had done the best they could. In truth, it did not make so much difference then. They did not do so much tillage then. They sowed wheat by hand among the stumps, and mowed with a scythe. You could cut a small, irregular-shaped lot as well this way as you could a larger one. I believe I should like it better to have the swaths short, so I could stop oftener, and I do not know but I would when dropping potatoes. Glad they were not long when I was a boy! But, oh, how times have changed! With my six-foot mower I can lay low an acre of grass in thirty or forty minutes, in a long field, and the potato planter has a steel back, which never gets tired.

We were fortunate in having the highway running nearly east and west, pass about through the middle of our cultivated land. About half lies one side, around and back of the barn, and half the other side, back of house and each side of it. The road answers as a lane for us. The barn is nearly in the centre of land, so crops are quickly drawn in and manure out. This saves time. We can get to work quicker in the field, and work longer. Only for a few minutes, but a few minutes every day is something. We thought of this, and located the barn with this in view. Some object to having a barn one side of the road, and house the other. I like it. Of course, the barn was not built directly opposite, so as to shut off the view. And, of course, it makes a difference how the barn is kept. But of that in another chapter. The location of the buildings has much to do with the successful management of a farm. For example, I have a friend who has 100 acres of land, in a strip a mile long, and the buildings at one end. This is very bad. There is a constant and serious necessary loss here in managing this farm. The best he can do is to pasture the back half, and then he has a long lane of waste land, practically, to get his cattle up, and many of his crops and much of his manure must be drawn a long distance. If his buildings could be 80 rods back it would help greatly, if there was only a road there to let him out. He has some long rows for tillage, but they are most too long for manure hauling and drawing in crops

Our permanent pasture is back quite a ways from the barn, but we have no lane, as all the stock we keep we can lead up a narrow road that is left through the cultivated field. I will give you a plan of our little farm as nearly as I can draw it. You can see then the strips, numbered, on which the crops given in a previous chapter were grown. The dotted lines, of course, do not represent fences, but only imaginary lines. Remember, our farm was divided the best we could under the circumstances, not as I would



Plan of Farm.

like it to be. A shows you the narrow road (about 12 feet wide), between two strips, that leads to pasture. The pasture land is of no use for tillage—too rough—with some clear gravel and some blue clay besides cat swamps with no hard bottom. Here is a point that may be of use to some: The cow lot is a swamp which we were able to drain about 18 inches deep. It cannot be plowed, as when you get through the turf, which is heavy, an animal will go down as in water almost. I have pulled several horses and cattle out of the ditch that drains it. Now when we had this lot open with the other pasture, the stock would eat the upland grass and let this on the lowland go until it got large, and then you could hardly starve them to eat it. I fenced it by itself and put my cow in there (it would keep two) early, and she stays all the season and keeps grass down, and there is never any lack of feed, no matter how dry. I dislike so many fences to keep up, but we can hardly do better. You will notice in studying plan that five of our six strips of cultivated land centre right around the barn. Lot 1 was necessarily back and we can see a big difference when drawing in hay or grain, whether it comes from this lot or one of the other five. The road A also answers for getting to and from Lot 1. Our small fruit garden is at F. You notice the little acre and a half corner, C, that was mentioned above as taking so long to work; B is the barn and covered yard; H the house and yard, surrounded with trees and shrubs. There are other points that I will call your attention to in chapters on drainage. While you are looking at this plan I will refer you to what is said in previous chapter about the lay of the land being partly against me. The north part of Lot No. 3 is a steep side hill and has washed down and made a rod wide of land in cow lot, since I have been here. The north end of Lot 2 is much the same, also south end of Lots 1 and 4. We never think of putting in potatoes or wheat on these places without having the seed washed out, more or less, generally more. The slopes facing the swamps are sandy loam, and wash badly, and right here I may as well tell you how I have helped this washing considerably. You will remember my first rotation was potatoes, two years, and then wheat and seed down, leaving clover or clover and timothy two years. The second year these side hills were put in potatoes they would wash much worse than the first. A sod turned over, if heavy, is not inclined to wash so badly as stubble land. This, among other things, led me to change to the short rotation, plowing a heavy sod in the spring and putting in wheat that same fall and sowing clover in the following spring. The grass or clover roots hold the soil fairly well during the summer, or until the earth becomes settled, so it will not run as badly, and then the wheat soon forms a sod, so it will not wash readily. We often get a heavy shower, though, that plays havoc with the surface before the wheat gets well started. But this short rotation is the best we can do practically and is decidedly better than one that gives a stubble to plow in the spring. In our first rotation we sometimes used rye to make a sod, after the first potato crop, plowing it under for the second. This is a good way, but the short rotation is best, I think. I have noticed the same thing on other farms often. If you have a side hill subject to wash, and must plow it, get it back into wheat and grass that fall, if you can.

# CHAPTER IX.

## TILE DRAINING.

IF I were intending to buy a farm that had a heavy soil, a clay or clay loam, such as are most benefited by tile draining, and if two farms were offered me exactly alike in other respects, but one *thoroughly* tile drained and the other not, with a price of $50 an acre on the one not drained and $80 on the other, I would unhesitatingly take the latter. I would do it if I had but one or two thousand to pay down and must go in debt for the rest, because I should expect to pay out quicker on the more costly farm and then have something better when I got through.

But this statement needs some qualifying. It goes without saying that if I bought such a farm, even to keep stock on, to make that a leading feature, and if the land was reasonably adapted for tillage, that is, was not hilly, that I should want in Ohio, say, to grow clover, wheat and corn. And if intending to put in such crops I should want conditions right for raising a large paying crop. This is the way I feel after many years' experience in draining and with drained land and after hearing much from others who have drained. Again, if I bought a clay farm I would run in debt for money to drain it all thoroughly as far as it was to be plowed and as fast as it was plowed. I would not break up a field without first draining it. As my friend William Strong says, I would plant tiles before planting a crop, every time. I am not sort of on the fence in this matter, or half-hearted, but I would do it or let the farm alone. I would do it with a feeling of more certainty that I would get my pay than I had when I gave the money for the land itself. As one good friend expressed it at an institute last winter: "Good farming is thrown away on wet land." It is too much a matter of luck. And still when I am asked, as I often am, whether I would advise any one to go in debt for tiles, I dare not say yes, because so much depends on the man, whether he will follow up his draining with good farming that will bring the money out of his venture; and, again, whether the draining will be thoroughly well done, or whether it will soon be practically of little value. Tile draining is simply the foundation next to the farm itself of all good profitable farming on land that needs it. I wish I could grind this into every reader who has such land. There is no more question to-day as to its truth than that two and two make four.

We have some first-class farmers in this neighborhood, but let us look around a little. It is a very wet spring. A farmer put in one field of potatoes with the soil about dry enough. When I asked him if he was intending to put in the other, he replied, "No, it is too wet;" but still the wettest spot in the field formerly, a swale now tile drained, was amply dry then. What was the trouble? A part of the field is clay and needs tile draining. There will be delay getting in the crop and some land must get too dry or some be worked too wet all summer, and, perhaps, some potatoes will have the luck to rot. What can the best farmer do with such a foundation? Another good farmer, one of our very best as regards push and tillage, planted 16 acres of potatoes two years ago and failed to dig enough for his own use, as he told me. What was the trouble? A good foundation in the way of a crop of tiles well planted first. Some of the seed rotted (ground too wet), and then wet weather kept my friend off the land until weeds and potatoes had about ceased to race, the former having got so much the start. Oh! my friends, we are too prone to sit down and take what comes, instead of having something to say about it ourselves. As our minister said last Sunday, "We are too much the servant of circumstances, rather than the master." Once the farmer was impotent; now he is powerful, or he may be. There were fields of potatoes on well-drained land that same year that yielded near $100 an acre, or say 200 per cent. net profit. I go by a large field on my way to town that has oats growing on half of it (where they are not drowned out—which is on no small part), and the other half the farmer has not been able to put in yet this wet spring, and it is now the 21st of May. What is the trouble? Has the season been too wet? Well, yes, but there have been two days when those oats could have been put in nicely if the land had all been tiled systematically, and a good crop all over the field would be almost certain. The very foundation is lacking, and loss, delay and worry are the results. But I do not need to say more. These things are, more or less, to be seen every year on clay soils, and the tax paid is generally several times the interest on cost of tile draining. What business except farming could stand such a drain? Suppose the thorough draining costs $30 an acre, which will usually be a high estimate. The interest on this sum at 7 per cent. would be only $2.10. This is what the draining would actually cost per acre per year. On clay land, where ordinary crops are grown, is it too high to say that it may be made worth $10 an acre a year? This on the average, of course. I asked this question of several leading farmers last winter—men who have drained largely and are actually making the money—and they said $10 was not too much. This is, of course, only for cultivated land and the best of farming. It would not be difficult to find instances where a single crop saved would pay entire cost of draining, particularly for potatoes. Farmers should figure as other business men. If an investment in tiles will pay a certain 10 or 12 per cent. per annum, it is a big thing, one that no other business on earth would ignore. It is not reasonable to expect to get all the investment back in one or two crops, and still in extreme cases one may. Because one has not the money to do the draining, does not alter the fact. We should not blame farming because it does not pay when the very foundation of success is neglected. It is one's misfortune if he cannot raise the money to start his farming on a solid basis, not the fault of the business. But, later, I mean to show you that, no matter how poor you may be, you can drain your land and not get in debt. You can hardly be worse off than we were when our draining was done. I did not go in debt for draining (although with the experience I have had I would now), and I dare not advise friends I do not personally know to do this, but I can tell you just how to do it without and with entire safety.

But, first, let us look at some of the reasons for draining a little more fully. We drain to remove surplus water from the soil, first of all. Where water soaks right down, as on gravelly and sandy loams, there is no need of tile draining for ordinary farm crops. My friend, J. M. Smith, of Wisconsin, the noted gardener, has even his sandy land tiled, and surface drains two rods and a half apart, also, the tile drains being under the open furrows or surface drains. This pays in his line, in enabling him to get onto his land almost immediately after a shower. You all know that crops cannot thrive when their roots are in water-soaked soil. This water may stand on the surface some, but will do about as much harm if it stands in the soil. In a dry time the clay soil, if managed well, may be all right for growing a good crop. Draining makes it all right, nearly always, when crops would otherwise be a failure. Drainage takes out the stagnant water—the surplus that goes down through the sandy soil, and makes the heavier soil more like the lighter one, easier worked and quicker worked after a rain. Tile drainage makes the soil somewhat warmer, by taking surplus water out of the bottom, instead of leaving it to evaporate. Evaporation cools the soil, chills it. When I got out of our bath-tub the other night I was comfortably warm, coming from water warmed to 100°. But, in a moment, as the water began to evaporate, or be taken up by the air, I felt cold, although there was a warm fire in the room. When you sweat freely you do not feel the heat so much, because the evaporation cools you. Just so when the air takes the water from your clay soil, instead of the tiles taking it, the soil is made colder. This is partly why your wheat is so slow to start in the spring on wet clay land.

Then, water, as it comes from the clouds, has more or less fertility in it. The ammonia from your neighbors' manure heaps, dead animals, etc., etc., rises, and water, coming through the air, catches it and returns it, not all to the farm it came from, but equally on the just and the unjust. It is wise to save this by straining the water through the soil, by taking it out through the underground tiles, instead of letting it go off largely in surface drainage. This is one serious objection to drainage by plowing in narrow lands. I saw a great many wheat fields last winter drained in this way. It is better than no drainage, but it is only a makeshift, not a perfect way. The field that is reasonably level and well tile-drained has its surplus water taken away after a shower, and then there are two or three feet of partly dried soil to catch the next rain and save the fertility in the water. If it rains very hard, of course, some may run off over the surface, but the drainage will help greatly in this line, as will, also, level culture and keeping some crop growing on the land, instead of leaving it bare during winter. Of these points I will write more under their proper head.

Tile drainage prevents much of the injury that arises from the freezing and thawing of a very wet surface. You all know how in this way clover and wheat roots are little by little lifted up until in the spring they sometimes lie on the surface almost entirely. The sudden freezing on the surface, with the ice attached to the root, necessarily lifts it a trifle as the frozen surface lifts, and does it with a power that will break it if it does not come, a power that can rend rocks. Then when it thaws the next day, perhaps, the soil settles back ready to take a new hold, but the root does not. All of this injury cannot be prevented by tile draining, but most of it can be. Tiling does not make a man entirely independent. It makes him powerful where before he was impotent, but it does not make him all-powerful. For example, I once had a field of wheat that went into the winter in splendid shape. The land was well drained. Along through the middle of the field was a swale that was most thoroughly drained, as well as man could do it. In the winter there came a sudden thaw, and the snow melted into slush and gradually worked down into this wide swale. The earth beneath was frozen so no water came out of tile drains. Just at this point there came one of those sudden changes of temperature Northern Ohio is so noted for, and quickly that slush was changed into ice. It was rough, but ice that one could skate on, from end to end of the lowland. It staid long, and smothered much of my best wheat, right over tile drains. Instead of thirty-five to thirty-eight bushels, as this field had produced before and has since, we got an average of but twenty-eight, although where there was wheat it was as good as ever. Would you know some of the trials that one who tries to push what his experience teaches him is best has to bear? One man was so unkind as to lay this diminished yield to soil exhaustion from our method of farming. I have had to take the same when frost or blight struck us, without any regard to facts or truth whatever. Such is the fate of men who dare think and act a little out of the old rut, but it seems hard that good men will try to undermine the influence of fellow-workers for the best good of agriculture.

I think it must be plain to all that until you can mostly stop this freezing and thawing on the surface, this lifting of clover and wheat roots, these crops will not be very safe. There will be a good deal of luck about growing them. Oh! how all good farming sort of links together. But, now, some will say: "But will not this tile draining make the soil too dry in a dry time? are we not overdoing the matter?" No. The draining only takes off the *surplus* water. There is plenty left in the soil that it will hold for ordinary times. In a dry time capillary attraction brings up moisture from the subsoil, the great storehouse, even from quite a depth. If we do our full part in the matter of culture we need seldom fail of excellent returns. Practically, I think well-tiled land stands drouth better than undrained. When at institutes, in Northwestern Ohio, two or three years ago, I determined to find out what the leading farmers there thought about draining being overdone. Just at that time there was some talk of this kind in the papers, coming, I fear, from those who practically knew nothing about the matter, just as most all opposition to good things does. As our minister puts it: "A man doesn't know anything about truth until he is true." There is a good deal in this. Well, these farmers in the level lowlands of Northwestern Ohio ought to know something about tile draining, on this principle, as they have done very much of it. Let me give you a few extracts from notes taken. One old gentleman said: "Twenty-five years ago a man who did not shake three months in the year was ostracised. Health now is No. 1; crops benefited 100 per cent.; have lived here thirty-three years; drainage is not overdone; we have not done enough." Another said: "Any man must be crazy who has lived in this county and seen results and says draining has been overdone." This man was the oldest pioneer present. He said, further: "Fifty-one years ago was the driest season ever known in this county, and there was not a ditch then, just quagmires and swamps." A county officer was called on for facts. He said: "The best drained farms in this county have the best buildings, the owners are the best dressed and most intelligent, and at the Recorder's office you will find them the most free from mortgages."

You all know of Col. J. H. Brigham, now master of the National Grange, a man who has the interest of farmers at heart and is one of them. Well, he was there and was called out. He said: "Draining will not always pay 100 per cent. It will not pay to drain grass or pasture land. I have drained as much as any man in the county. Drainage has affected some shallow wells, but not the season." One man said he laid the first tiles put in in his county. Had several miles then. Does not think they do any injury in a dry year. This was the way the testimony all ran. Again, drainage deepens your farm, gives you another farm down under your old one, deepens the feeding ground for your crops. With this done you have but to follow up with good culture, oftentimes, to get greatly increased crops. At our experiment station grounds at Columbus, Ohio, the average yield of wheat in 1889 on unfertilized plots where the land was drained was 43 bushels per acre, showing that on such clay land all that was needed was to get the surplus water out, to get a good crop, if the culture was right. This land was drained 3 feet deep with 3 inch tiles, 36 feet apart. The soil is what is known as a cold, wet clay. If I remember correctly they got 37 bushels per acre on unfertilized strips the next season. Oh, there are vast stores of fertility lying dormant on many clay farms that might be turned into money and make the farmer well-to-do, if this necessary foundation step was taken. Also, clover can go down and collect and bring up fertility better when the land is well drained. It cannot do its best on clay land until it is tile drained. Surface drainage will not answer at all for this purpose, for deepening the farm. Of course, also when water goes down freely, instead of being evaporated from the surface, air follows it down and this does good. My friend Everett, of Westerville, Ohio, claims that air goes up the drains from the outlets and passes up through the soil, and the soil being cooler it deposits moisture as it passes up and thus helps the crops. Mr. Everett uses larger sized tiles than are needed to carry the water on this account. He has made a grand success of tile draining, as facts and figures given at our institutes last winter show. Just how much there is in this passage of air upwards I do not know. Three conditions are necessary to best success in agriculture, certainly. They are air, moisture and warmth; drainage helps us towards getting all of these, the warmth and air in particular and the moisture in the proper quantity, not in excess.

Drainage prevents surface wash somewhat, but not entirely always. In a very hard shower water will run on the surface on my best drained soil, whether drained by nature or with tiles. In a dry year draining certainly helps the crop in one way. We can get on the land to stir the surface after a shower quicker and thus sooner check evaporation and save moisture for the crop. If my land had not been well drained I never could have got the yield of potatoes I did that dry year, 1881. A great rain came in June, practically the last that season. I was able to stir the surface very soon after it and save many tons of water from unnecessary evaporation. Of course, it was the tillage in time that did this, but the tile draining where needed gave me the chance to do it in time—was the real foundation. Turn back and look at the figures, $1,438 from 11½ acres! And this was a year when many failed. That was what made the high prices and the great profit to the man who succeeded.

Underdraining helps one about getting along with his work. He can plow earlier, thus making it easier for his horses, as he can do this heavy work while it is cool. It will be a bad season, indeed, when a man on a drained farm cannot get in a reasonable amount of crops in good time. This year comes the nearest to cornering a drained farmer of any I have experienced. Tile draining helps one to keep weeds down cheaply by harrowing corn or potatoes; it makes the land dry enough by spells even in a pretty wet season. But haven't I said enough to show that it is the very foundation of good farming on land that needs it?

# CHAPTER X.

## TILE DRAINING SWALES, CAT SWAMP, ETC.

THE last chapter treated of tile drainage in general, for farms with heavy soil that need to be drained regularly all over. But we have many farms where only partial drainage is needed. Most of the soil may be sufficiently underdrained by nature, but there are clay spots, or springy spots, or swales, or little swamps, scattered around on otherwise well drained farms. It may be poor business economy not to regularly drain a clay farm, but is much poorer to let these wet spots in an otherwise drained farm go year after year. A little money invested here would pay so largely, as a rule. My friend, W. W. Fenn, of this county, has evidently done some work of this kind lately and has neighbors who have not. Hear what he says in a late *Ohio Farmer:*

"Why don't you drain the water out of those spouty wet places where you get rag weeds instead of oats, or the clover don't catch, or if it does it freezes out? Why don't you drain those places in your fields that make you wait in the spring, or you have to plow them wet, and, if planted, the potatoes rot and the corn is small? Why don't you drain those places where you throw your lines on the drag and let your team wallow through while you run around? Why don't you drain those swampy places that have never been plowed so you can go straight through with all your work and get a crop from the whole field? I am getting the heaviest crop from these wet places since they were drained. There is nothing else I have done on my farm that has paid me so well or made me feel better."

I have had a good variety of this kind of draining to do on my farm and can fully endorse everything Mr. Fenn says. Let me give you some examples. Three or four rods from the northwest corner of Lot 6 (see plan in Chapter VIII.) was a natural depression when I came here, locally called a cat swamp. It wasted perhaps a quarter acre of land by what it actually covered by water in a wet time, but from its peculiar location it really spoiled about an acre. You see the little space left between that and the fence was not worth plowing by itself. This was right on the road, where it spoiled the looks of the field, too. And it was always full of water in winter, and seldom or never all dried out in summer. A nice hole to have so near the dwelling-house, wasn't it? But it had been there since the country was settled, just the same, breeding frogs and miasma. That was not all, though, for the cattle were driven or went there winters to drink out of a hole cut in the ice. Yes, mine did the first winter; I could not do better. A horrid, filthy drink; wonder it did not kill the cows and us too. The cheapest outlet for this place was across land of a neighbor, west and out by side of highway. We had to go about six feet deep through the neighbor's field, for a few rods. This was quite a ditch for a raw hand, but we worked with a will. By the way, the previous owner of farm had hired that depression tile drained and never came near to see how it was done. It never worked, I think, as the tiles were laid up over the hill, about at a uniform depth, as though one was putting in a syphon rather than a drain. Perhaps this is exaggerated a little, but they were not put in so they did any good. We cut through the bank, making a ditch two feet wide on top, where it was deep, and dug down and graded until we drew all the water off and it flowed with a nice uniform current. The centre of swamp was soft a long way down, as I found by running down a pole. Now I might have laid tiles up through the middle on boards and drained the place, but I would prefer not to do this. It isn't a lasting foundation and would eventually settle and make trouble. What I did was to take a sharp stick and probe the mud all around the outside of swamp, finding and marking as I went just how far in I could lay tile on hard clay bottom. This was, perhaps, ten feet in from bank, on the average, and the depth down to clay through the mud was about two feet. I did not think it necessary to lay deeper, as the swamp would gradually fill up by tillage; in fact, we scraped some soil in with horses after plowing first time. Having established this line, I went to the lower end by the road side and brought up through two cuts, with 14-inch spade, which makes about two feet. Then a groove was cut in the bottom to place tiles in and I laid 3-inch ones to the swamp and then 2-inch ones in the two drains that went around the outside and came together into the 3-inch one. It was an awful nasty job, but the tiles were laid on a clay bottom, and by being very careful in laying and filling we knew they would be all right after the mud once got dried out and settled. You may rest assured we did not step on the tiles after laying, nor near them. All the particulars about laying tiles will be given in another chapter. I might say that the digging in neighbor's lot was partly in sandy loam that was inclined to cave and was somewhat dangerous. We were careful not to stoop down. Buried standing we could hardly be hurt. At noon we had the ditch about ready for the tiles. I did not stop for dinner until they were all laid through the bank and slightly covered so as to be safe. And when I went out after dinner tons of earth had caved in. To avoid stooping I laid the tiles from the top of bank with a long, pole as I will describe later.

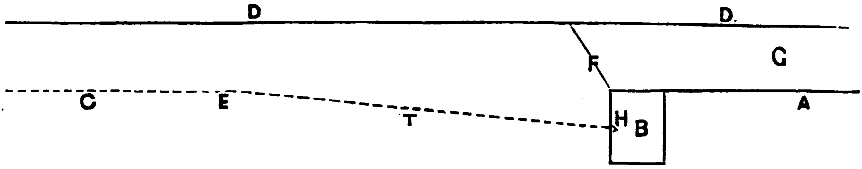
But do you think our troubles were over when we got the drain in? Not by a good deal. When the old settlers cleared this land, timber was of no value. Ransom Sanford, now living, tells me that his father sold a man a great noble white wood tree that it took two of them all day to get down and cut up, and helped the buyer cut it, for 50 cents, and the man always felt as though Mr. Sanford charged too much for it. The tree stood in the road, and I got the stump out since I came here, and I think it cost me more than 50 cents to do it. Well, with timber so plenty, when they cleared the farm they threw every tree they could into these little swamps, to get rid of them. What was out side, stumps, etc., was all rotten and gone, but when we come to get into swamp where water had nearly always been, we had a picnic. Many of the oaks were as sound as the day they were thrown in. We had to pull them out. Some were dried and cut into wood. Some are down in there yet below the reach of plow. Once in a while one works up, and we pull it out.

But, at last, we got the place ready for tillage. It hadn't cost much money, only a few tiles. The work was done in the spring, when it was too wet to do any regular work. I do not now remember exactly, but think it took my man and me a week to do the job. It is now always dry, and usually grows a heavy crop. We have grown in a dry season potatoes in there that yielded at the rate of $240 an acre. But in a wet year the constant saturation of the soil, by surface water running down into the hollow, makes potatoes almost a failure right in the centre. It is almost too rich yet for wheat. My wheat in that spot is down to-day (May 24th). Still, with all drawbacks, it has paid tremendously. We have had to mow the wheat in there, and cock it up, but I would hardly dare tell you how many bushels we got three years ago. It is better this year, and will grow better, as we are able to exhaust the extreme fertility a little. Of course, such places have been accumulating fertility for ages. They will need none put back for a lifetime or more. All that grows on them, and is removed, can be used to bring up the higher and less fertile land. Were you to ride by my farm to-day you would hardly notice this place, except from overgrowth of wheat. You could hardly realize what it was and how man had made it over. And now we use the *whole* corner, and go right straight through and breathe purer air. The only loss is the old-time music of the frogs. I would say that this drain and all others work just as well to-day as ever, and I see no reason why, if the outlet is cared for, they may not last for hundreds of years. With good tiles, rightly laid, there is no need whatever of filling up, or any other trouble.

We have drained other little swamps where there was a clay bottom by laying tiles right up through the centre. Or, perhaps, two or three parallel drains may be needed, after you get into the depression, about two rods apart. Let me advise about draining all such places as we have been writing about, that you get your tiles too large rather than too small, if you intend to put in tillage crops. Water standing a short time on a growing crop in hot weather usually ruins it. The coating of mud deposited on the leaves is almost as sure death in some soils as the standing under water. I sometimes take a hand force pump, and water in a barrel cart, and wash leaves of potatoes as soon as drains take the water down and before the mud on leaves dries much. I have saved a crop in that way. It is not usually, but once or twice in a season, that we get showers that will fill these hollows. Here they generally come in June, and if we get by them we are all right. Now, if you will look again at plan of farm, you will notice some dotted lines on south side of road running diagonally. N was a small swamp on neighbor's farm. O was one on my land, and the dotted lines show you the natural direction the water took in working across my field. P is the outlet of the drainage system of this lot. There is quite a depression at O; it is about four feet lower than the land in centre of lot 5. Of course, this means that O was a cat swamp, as it had a clay bottom and no natural drainage. Previous owners of the farm had plowed out a sort of ditch, so the water ran off before it spread over more than about half an acre. The same syphon tile artist had put in a line of two-inch tiles the year before I came here, which never did any good. Water stood at O practically all summer, although it was a larger swamp in winter. The natural flow of the old barnyard for forty years had been into it, and no one attempted to go against nature in this line. They let it go. And I am inclined to think the more went, the better some of the tenants liked it. One said to me, when I spoke of draining it: "I wouldn't. It is so handy to let stock down there to drink." Mercy! But doubtless that, along with the starvation, had helped them to an income early in the spring—hides to sell. But I do not know as it was any worse than the water in the house well. For forty years, or more, they had plowed around this hole. The day had not arrived for any better farming. Well, the day did not arrive for some years when I thought I could afford to drain this place. In the summer there was only about a quarter of an acre of waste land. The distance from O to P was 60 rods. To buy tiles and lay drain as deep as we must through bank would cost some $50. When we got ahead enough so it had to go anyway, as a matter of health and looks, whether the money investment paid or not, we went at it in the winter. I don't think I ever did anything that the older men thought quite so foolish. $50 for a quarter acre of land, with land worth $40 an acre! But I had a good deal of confidence in my own judgment by this time and went ahead. The land was drained by mains running in the same direction, but I put in a special through line of three-inch tiles for this cat swamp. My idea was that the water must go off in a hurry to do any good.

I once tried draining a cellar into a land drain and it did not work. When the water from the soil filled drain full it backed up into the cellar, or did not take water from around the cellar. I feared to drain this place into the regular main, and you can see why. I must have the water go straight off at once, and not be hindered at all, or my crops would suffer in the hole. I dug this drain through in cold weather, laying tiles and filling as I went. It cost fully $50, counting labor. I used three-inch tiles. Would use four again. It was very dry the fall before we began this drain and I put wheat in this field and pretty nearly all through the swamp. Then I worked to get up through there and save the wheat, if possible. Well, it was done. There was some wheat under water when we got there, but it was saved fairly well. The next season Hungarian grass was put in, and the season following (1881) potatoes were planted in Lot 4, right through swamp and all for the first time. Everything went all right till along in June, when the potatoes were about six inches high. Then there came a flood. How it did pour! When I went to bed at night there was a quarter acre under water, although the water was more than pouring out of the drain at the outlet. I saw the wise looks of two or three old neighbors—the sort of I-told-you-so expression "Tile draining will do to play with;" "We pity you, but you wouldn't listen to us." I didn't laugh very much. My time had not come. I wasn't at all certain it would. I didn't sleep well. That night was to decide whether or not I was a fool. I got out my pencil again and figured out how much water was in the hole and about how long it would take it to run out. In the morning it was *all gone to the last drop.* The potatoes were slightly injured, but soon recovered. We had no more rain to speak of that season, and in the fall I dug and sold the potatoes from the hole that was under water, and that would have been ruined but for my drain for $66! Then I laughed. The net profit on that one crop paid the entire cost of drain and a little over. We have made money out of this place since, on the average, but not always. It is too rich, and in a continued wet time it is too wet. Laying the tiles as I did, in midwinter, and closing up as we went, I wasted a little too much fall, and when I got to the hole I could lay the tiles only 14 inches deep from the surface to top of tiles. We have scraped in some since, but wish the drain was deeper. This spring I put in a number of little spurs quite close together, to help drain the hollow better. A shallow drain does not draw far. I sighted through with level beforehand, and thought I could get tiles at least two feet deep, and I would in open weather, when it was possible to open the drain right through before laying any tiles.

But when I got the little swamp O drained I was not yet quite fixed. That swamp at N, on neighbor's land, although it only just came under the fence onto my land a little, furnished water that soaked down through the soil towards O. What should I do? N could be drained south through my land, but at considerable expense. My neighbor did not want to pay much of it. I determined to fix it so it should do me no more harm, and at small expense. I could not take water into regular land drain, as N was too low. I decided to risk adding a little more water to my through line O P. A two-inch drain was laid from O to N. But N was full of water. How should I get it into drain without carrying any sediment or rubbish with it, and arrange so it would always keep pond N down? I did not want to go up through and drain neighbor's swamp thoroughly—that is, lay tile up through it. This was a study for some time. I finally built a dam of sods around a place in the fence corner, just on my land, but in lower end of pond. Then I bailed out the water from inside of dam and put in a device of my own get-up that has always given perfect satisfaction. It is a complete way of getting surface water directly into the end of a drain without a single drawback. The accompanying figure will explain it to you, with a little help. C is the line of tile coming up from O in a regular way, some three feet deep. When I got to E I stopped laying tile and dug a hole at B large enough to put a salt barrel in and deep enough so the top of it was just exactly level with point E. Next I dug the rest of ditch for tiles from E, grading down to H, in the centre of barrel. A hole was cut in the barrel just large enough to let the end of tile in. Then I filled the ditch and covered the fresh soil with sods at F.



Device for Letting Surface Water Into Tile Drain.

A was about the bottom of water in the pond, D the surface of it. A strainer was put over tile at H to keep frogs out. Then I opened the temporary dam and let the water rush into the barrel. You see the operation. As the water rose in B it backed up the down grade tiles T. When the barrel was full it had, of course, reached E, which was at the same level. Then as more came, rising above top of barrel, it flowed over at E and on down C regularly. The great point of this is that no floating rubbish can get into tiles, as that stays on surface of water, which is never lower than top of barrel. When water gets down there, drain stops running. No sediment or dirt can get in, as that sinks to bottom of barrel and can be removed with long handled shovel from time to time. In case the barrel should get filled with mud, no harm will be done drain. Mud will not run up hill in the tiles more than a foot or so. Clean out the barrel, and away it goes again all right. Frost has never done any harm, as the end of tile is lower than ice will freeze. Water in top of barrel may freeze and stop drain, but as soon as it thaws, away it goes again. Pretty cheap thing, wasn't it? But it is perfect. Well, when I let the water in I started for the outlet of drain some 80 rods away and didn't get there much too soon, and I had the satisfaction of seeing my neighbor's swamp drained, cheaply, so low that the leakage would never harm us more. It took a two-inch pipe some time to run the water down, but once down it kept it so without the least trouble, and in case of an overflow at O, I could shut off N for a few hours. My neighbor has since drained his swamp south through my land, entirely at his own expense; but the barrel stands there as a safeguard in case his drain should ever stop up. The barrel device really used at that point N is slightly different from the one pictured. I improved on it afterwards and gave picture and description of latest and best. It is working, however, and has been for many years, *exactly* as described at D in Lot 1 (see plan of farm). Here I had just the same problem to solve, only the swamp was on my own land, in middle of horse pasture. I did not care to drain it—could not very well, any more than just take surface water into the tiles from a shallow, open ditch. From D to E (in plan of farm) was a swale dividing this lot really into two. For forty years men had plowed and mowed and worked these pieces separately, unless it was a very dry time, when they might plow through the swale, but they never would get a crop there. Well, I had got to go straight through, have long rows and less turning and take that water *under* the field out of my way. I was awful poor, but could afford a salt barrel and some three-inch tiles. Six-inch would not take all the water at once that comes down here from many acres around, together with what my side drains in Lot 1 brought in. Probably an eight-inch would have been taxed. But where there is a will there is a (cheap) way. Six or eight-inch pipes were out of the question. It so happened that the swale at D was only about a rod wide between banks, and banks several feet high. I put in my barrel device right under the fence, and then just to the west in Lot 1 built a dam of earth high enough to hold back in the swamp above, on two or three acres, any flood that might come, and hold it till it can get through the three-inch drain. The overflow in pasture does no harm. It would ruin a crop below. Now it goes under with entire safety. I am master. That original salt barrel stands down in there today, friends. It works automatically, year in and year out, and perfectly. The land above is in grass. No mud to speak of comes down. If there did the barrel would need to be larger—a well, in some cases, of large size. But rest assured it will do the work and never make a blunder. G is the open ditch that brings the water from the swamp. The dam is across just to the left of F. I forgot once, who doesn't? and this barrel got full of mud and I went down at high water and little was coming out below; and to pay me for not attending to things, I had to clean that barrel with a long handled shovel, through five or six feet of water, standing on a raft. But as soon as I got a hole through, away it went all right at once. This will do the business whenever you want to let surface water directly into a tile drain. In any ordinary way the sediment will soon fill the tiles. A sewer pipe, or a bricked up well, would be more substantial. but I used just what I tell you, a salt barrel, and there it is yet.

Now, while considering this drain, I can tell you what I know about roots in drains. Some spring water comes from this swamp, so the drain is seldom dry. One year, when the field had wheat on it, along towards harvest time it became very dry. Suddenly we had a shower, and the drain failed to give out much water at the outlet. I examined the barrel end, and it was all right. Soon it stopped flowing altogether. I was in a quandary. I put every tile in myself, and knew they were all right. I dug down and took up a tile, and the mystery was solved. It was *full* of wheat roots. I pulled out great strings of them at this and other points where I dug down. This alarmed me. I feared the drain would have to come up. Well, the wheat soon got ripe. Then the water began to run a little again, first I knew, and soon the drain was all right. The wheat roots died and washed out. Whether they would have done this in an ordinary drain, or whether the sediment resulting would have stopped the drain, I cannot tell. Water came through the drain with a good deal of force, all the tiles could hold, and with a head of some feet at the upper end. No other crop has ever troubled me. The wheat roots went down during that dry time into the tiles for water. If there had not been spring water flowing there would have been none there, and they would not have gone in.

You have, doubtless, often heard it said that it was important to keep the outlet to drains free and open. It is, and, still, I have some drains without any outlets that are doing satisfactory work. At the outlet of a large system of drains, where miles of tiles empty, much sediment will wash out, and the outlet should be entirely open and clear, so this can wash out of the tiles entirely. But when you have only a little short drain, with little water running, the accumulation of sediment is slight. It is better to work your drains into a single main, and have but one outlet, but sometimes this is not possible. For example, near the southeast corner of Lot 1 (plan of farm) was a little wet spot along the fence at the bottom of hill. Over the fence in horse pasture is muck swamp. There was a hill between, so one could not carry water from this by tiles into the regular main from D to E. I did not want an open outlet there in the pasture, and so laid the tiles regularly, only used large tiles for a few feet at the lower end in the swamp. It was laid just as though I was going to leave an open outlet, but, instead, it was all filled up. The water runs down there just the same as though the lower end was open, and then soaks away in the muck, down to the level that the swamp is surface drained to. This would not work, of course, with any large flow of water. I used larger tiles at the end, so if sediment was carried down it would take longer to fill them. I have a number of little spots drained in this unusual way, and they are dry and all right, and have been for quite a number of years. In one or two cases water was taken through the rim of a clay saucer into more porous subsoil below, and now soaks away. The largest drain of this kind was put in two years ago. In Lot 2, about 10 rods back from the road, nature left a "pot hole" on our farm. It was quite deep, so draining in an ordinary way would be very expensive. It was never a "cat swamp." Water always soaked out in time. When the field was in grass there was no trouble. But put in a crop of potatoes, and a heavy shower would cause water to flow down from the higher land around until a pond was made that would not soak down for days, and in a wet time it might stay for weeks. Of course, this was a great eyesore, and it was very unhandy to cultivate the field when there was a pond or mud hole there. And we never failed of having a rain in May or June that would fill it. I made two or three experts large offers to drain it—no cure, no pay. But no one would try it. I remember my friend, Rev. E. D. Vance, once said to me, "Why, Terry, I would conquer that if I had to pump the water out with an engine." My wife said she would drain that, if she were running the farm, if it cost a thousand dollars. This was merely her way of saying pretty strongly that she would like to see the last of it. She is more slow to spend money than I. For years I was not waiting on account of cost so much as from uncertainty as to whether I could make a success of it at any cost. The great question was whether the sediment washed down would not hold the water long enough to ruin a crop, tiles or no tiles. The regular outlet for this place was through the drain O P, on south side of road. But there was a hill to go through, 10 feet deep, to get to O, and drain O P already had all the water it could carry. It would have to be taken up, and relaid with larger tiles (a big job), if more water was turned in. In the hill, between pot hole and O, I knew there was gravel after getting down some feet, so I laid my plans and began. I dug straight towards O to the north side of highway. The last 100 feet was in gravel and just at water level. But this was in the spring—in a wet time. The drain was carried level, of course, in the gravel, as we could not dig down in the water to make fall. I put in four-inch tiles, and closed the ditch, without any outlet. But it was in the direction that I could make use of it afterwards, if it became necessary to go on to P. It was a hard and dangerous job, digging through that bank 10 feet deep. Twice one of us was buried so he had to be dug out. We had to partly crib the ditch with planks. After the main was laid we put some 400 feet of two-inch tiles in to collect the water quickly in the way of side drains. These were put but 8 to 10 feet apart, and about 16 inches deep. When this was all done, we plowed the field and put in the potatoes. The job cost about $10, for tiles, and our own labor only. The hole filled with water, as usual, during a heavy shower, but was quickly gone. As an eyesore it seems to be ended, but whether I can grow a full crop of potatoes in there in a wet season, I am not certain. The wheat, after potatoes, was grand right through this hole. Of course, we had to mow it with a scythe. The clover there now is the same. We rather hope we are agoing to be able to draw big crops from there, and put nothing back as long as we live. Time will tell.

I have now given you samples of all the different kinds of irregular draining we have done on our farm.

# CHAPTER XI.

## HOW TO TILE DRAIN.

BEFORE going any further, I want to say to you, friends, that in the great majority of cases it will be best for you to learn all about this matter yourself and do the work yourself, with your regular or some extra help, during the wet weather, in fall, open winters, and early spring. At any rate, you should know just how it ought to be done, and see that it is so done. Nothing has put tile draining back so much as the poor class of work that has been done by so-called professional ditchers. I do not say they are all poor workmen; I know they are not, but I do know that a great many are not to be trusted. Many of them are honest, but not skillful. A man who helped me some, and would dig all right under my direction and constant watch, was employed by a neighbor to lay a lot of tiles by the job, for so much per hundred tiles laid. The drain proved worthless, and, when taken up, they found tiles buried often two in a place. Had the owner of farm hired this man to dig the ditch and get it ready, and then gone there and known the grade was all right, and then laid every tile with his own hands and put a little earth over them, leaving the man to do the rest, all would have been well. We ought to boss our own work, particularly such work as this, that will be of no use if not done just right. We ought not to expect a man who works for a dollar and a half a day to be a skilled laborer, whose judgment can always be trusted, even if he is honest. If he were such, he would not be long going about laying tiles for others at low wages. I have never known but one man whom I would trust to lay tiles for me.

There is a feeling among farmers that ditching is beneath them. I have seen this. When advising some such to drain some land I have felt this, and I know they went and hired a man to do it, and generally got badly cheated. Well, I have never felt this way. I have laid every tile on my place and done much of the digging. There is a difference between ditching and digging a neat, narrow place for tiles, where skill and thought can save much labor. A gentleman who visited here once, and had read my articles in the papers, actually took my hired man one side and asked him whether it was true that I got right down in the ditch myself! Friends, if I hadn't I never would be writing this.

Perhaps you think this is not in accord with my practice of special farming and becoming an expert in one or two lines. Well, there can be no certain success without a head manager, who, at least, knows that everything is done rightly. A little carelessness in grading, or a poor tile put in, will eventually cause trouble. Do you think ditchers are better than other men that they do not need watching? The best of workmen, most honest and faithful, sometimes "don't think." There should be one man on the farm whose business is to think. I assure you, as much as you may despise ditching as a business, that if you will go at it rightly and put in a single drain properly and watch it draw the water off, you will forget all about your former views. By the time you have been down to the drain two or three times in the rain to see the water come out of your tiles, you will begin to be enthusiastic like the writer. Again, many farmers cannot afford to hire draining done right out, or could not raise the money to pay for it. They can get it done in this way at little outlay except for tiles. I drained some of those waste places told of in the last chapter, when I know some farmers as hard up as I were sitting around the house, thinking it too bad weather to be out, "and then there is nothing one can do now, any way."

My own draining has all been done by hand. I have not used any machine or the horses. It was done in a small way, little by little, usually in bad weather, when it was so soft and wet that team work would be unsatisfactory. For draining a large field at once, some labor can be saved by plowing in lands, so as to bring dead furrows where one wants to put the drains. Then one can plow again in the dead furrow and shovel out the loose earth. A horse or team on each side of ditch, with a long evener and a chain attached to plow, and a light plow, will readily loosen up the earth to a depth of eighteen inches or so. Part of filling can also be done with a plow. But, of course, in this way one must cut a wider ditch than when doing all the work with a spade.

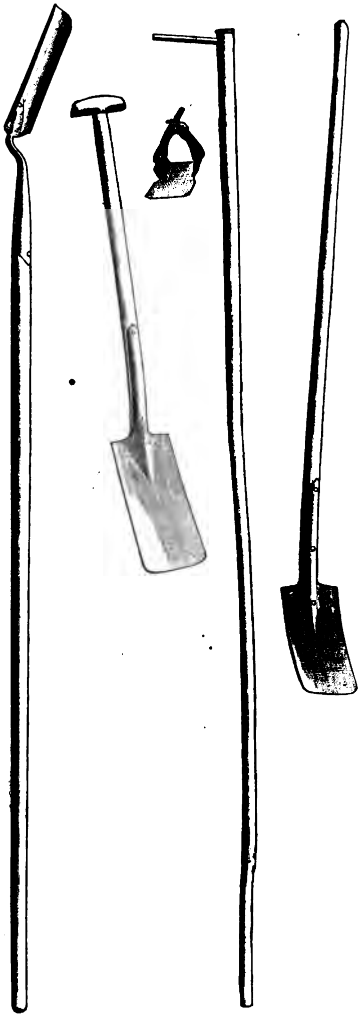
The following is the way I have done all my work, which has always been on sod ground, draining just before we broke up for a crop. Beginning at the outlet a line was stretched where drain was wanted. Then with an axe I cut the sod by side of line. Next moved line over and cut the other side. For my own digging I would not, for thirty to thirty-six inches deep, cut more than ten inches wide. Then move the line on up the drain and cut more. For digging I use an English spade fourteen inches long. Well handled, this will take out about a foot at a cut. It is about six inches wide. When placing the spade down I never put the blade square across the drain, but always diagonally, first one way and then the other, with one edge out, or nearly so. This leaves but one side of the spadeful to break off, the outside. This is one of the hardest things I have ever tried to teach a new man to do. But it is the way all experts dig. After forcing the spade down by your weight, push it slightly forward to loosen the earth, and then pull back and take it out and land the whole spadeful on the bank if you can. In time you will learn to throw it nearly all out clean, although in some soils this is difficult. A green hand will often leave half of it, let it crumble off the end of the spade and fall back, and then it must be shoveled out. I always put the first cut or sod on the right side and pile it in a narrow high heap about one foot back from edge of ditch. Then I walk on this little path to do the scooping for laying tiles and also lay the tiles from the same place, as I will describe later. Then the next two cuts in regular draining, three cuts deep (near three feet), are thrown on the left side (as you face the outlet) close to bank and high up, rather than far back, so it will go back in easier. In this way you can put the subsoil back in the bottom, and the soil on top, when filling. Of course, when you come to where you want a side drain you must dig out a way as you pass. The bottom of side drains, for three or four-inch mains, I leave about two inches higher than the bottom of main. The water should flow down into main some, not go in on a level.

After digging the first sod or cut, I take a shovel and clean loose earth out of bottom and throw on top of sod piled outside. Almost invariably when I do draining there is water in the soil. After getting out this first cut all clean, I grade the bottom with spade or shovel, so water runs with an even fall, what I think I can allow. Then I dig the next cut with same spade, taking care to hold it just the same way, and force it just the same depth, all the time. This keeps an even grade. A man not used to it will vary his digging considerably and this will make trouble afterwards. Of course, the second cut will naturally be narrower than the top, say eight inches wide. To clean this and the bottom cut out I use a narrow shovel of my own make. I took a common shovel to the shop and had the sides cut off, so it was scant six inches wide, then I put in a long crooked handle, such as is found in the four-tined manure forks we use, but the crook turns the other way, so when standing up straight, nearly, I can push the shovel along ahead and clean bottom of ditch. I stand in bottom to do this. The third cut is dug no wider at the bottom than six inches, for tiles from two to four inches in diameter. It is cleaned out in the same way as second and earth thrown on subsoil pile outside. Next I take a scoop (one that pushes from you I prefer), and beginning at lower end and walking along next to sod cut out the little groove that the tiles are to be laid in. After cutting through I notice particularly the flow of water in the groove. If there are any " rapids " I do some more scooping, until there is an even, uniform flow or current from end to end, where this is practicable. Of course, you may run along some distance on quite level land and then come to a side hill with much more fall. You could not here make the fall all uniform from end to end. Scoops are mostly used standing in bottom of ditch and are so made. I took mine to the fire and heat and bent the shank until it is just right to use from the bank. I can do a nicer job pushing than pulling, and do not have to walk on groove after it is cut. But everyone to their notion. If it pushes very hard I get my right hand at end of handle against my right knee, which helps some. Scooping from the top I can walk back and forth until I get it just right. If water is not flowing (which is very rarely the case when I drain), I draw some in barrels on a stone boat to grade with. When water runs all right I *know* I am right. I have never laid any regular drain without it. It is the simplest way to be certain, and best for me, although I have tried the various grading devices. Water runs down hill. You are laying a drain to take it off. Go by it and you can never make a mistake. Of course, on land where there is a uniform and good fall, one might dig and lay tiles in a dry drain and get them about right. But you see the water run and then you *know*. No half way-work or guess work or eye work for me in grading a tile drain.

Now, you are ready to lay the tiles. Some begin at the upper end, when drain is all dug through at once. There is less danger of getting anything into the tiles, but I have always begun at lower end. It is more natural, and then I have done draining in bad, freezing weather, when what we dig each day must be closed up. Then it was necessary to begin at lower end. Draw tiles, and lay along on top of subsoil, looking at and *through* each one as you lay it down. If it isn't sound and hard enough, throw it away. Now and then there may be something inside of one. To lay, I use a pole, say, 7 or 8 feet long, and about 1½ inches in diameter. One inch from the bottom end I bore a five-eighths-of-an-inch hole, and drive in a pin about 10 inches long, at right angles to pole. The tiles are picked up, one at a time, from the bank, on this pin, and placed in position in the groove. After a little practice, one can handle them nicely and rapidly in this way, standing on bank. They can be tamped down with end of pole, which may have a ferrule on. I laid those four-inch tiles from top of bank with a long pole when draining that pot hole in ditch 10 feet deep. I would not have stooped down to lay them by hand for $1,000. The risk was too great. They may be laid, in ordinary draining, by hand, while walking on the tile, on hard foundation, but it is easier and pleasanter for me to stand up and do it. It may bother you a little at first, but you can do everything needed with your stick. You can knock tile close at joint by striking a little with pin in tile; you can turn, to make it fit, quickly by a side upward motion. If you cannot fit one tile, take it out, and try another. They should fit closely, at the top, anyway. You can almost always turn them until they do. In burning, they are often drawn a very little out of shape. They lie best and joints fit best, generally, with the hollow side down.

I always use round tiles, or tiles with a round hole, and either round or six-sided on outside. No others are used about here now. When you come to a side drain, use a tile in the main with a hole in it to let in the water from the lateral. Such are made and sold here now. When I did my first draining, however, I cut holes in the main tiles, or broke them out at one end. After fitting the lateral properly, so that the water will run down, partly, into main, cover joint entirely and carefully with pieces of broken tiles or flat stones. There are generally enough poor, cracked tiles, or those that get broken, to use for this purpose. After making a good, tight job that will not be displaced by filling, cover with a little fine clay. In ordinary draining there is no need whatever of putting straw over tiles, or anything over joints, that fit reasonably well. If you make a poor joint, open quite a little on top, put a piece of broken tile over it. In going through a sandy place, if you fear it will sift into joints, put a piece of paper over. I first read of this in *The American Agriculturist* some twenty years ago, and found it just the thing. I took an old book out, and a single leaf answered the purpose. I only wanted something to hold the sand until earth became settled about tiles. When tiles are ready to cover I take my spade and put a little fine clay over two or three, and get down on them. (By the way, I put a flat stone over upper end of lateral to keep earth out.) Then, with a spade, I cut or shave down, first from one side and then the other, fine clay subsoil, two or three inches deep over the tiles, walking along and packing carefully, with my feet one each side of tiles, shaving down ahead of me, as I walk. This subsoil is the proper covering for tiles. You do not want straw or surface soil to " let the water in." You want to keep it out all you can right on top. Let it work in gradually through the soil, and from the under side. It will not carry sediment then, as it will to flow right in from above. The tiles are solidly placed in a groove, so walking on them, with a little subsoil on them first, will not displace them, or should not; but be careful. Of course, fine clay can be thrown in from the surface first, but with me it is seldom fine, and I can get it in a hurry by shaving down sides. My time, that of the boss, is worth more than that of a man that can shovel, who may be trusted to do the rest of the filling. I often have taken a horse, and tramped the clay down before putting back the surface soil. It is pretty hard to keep him in the narrow ditch. Some say, " Why, if you tramp it, water will stand right over drain." Let it stand. I do not want it to run straight down at first. After ground gets settled it is all right.

This is my way of draining for a small farmer, doing some every spring and fall, perhaps. That is the class I am writing for. Experts, or those draining on a large scale, may do better. Most professionals dig the last cut with a long spade, just wide enough at the bottom to fit the tiles, and then clean out as they go with a scoop that pulls towards one. They dig a few feet and then take scoop and clean it, and so on. One can not, particularly a new hand at it, grade as perfectly as by doing my way and digging last cut about six inches wide. I want to go along my drains and trim the groove with scoop until just right. But take your choice. I have told you a good way to do good work, and do not, I beg of you, do anything else. Do not put a tile in until you *know* there isn't a place too low and the flow is quite uniform. If you do much draining, the time will come when you will thank me for insisting on thorough work, if you take my advice, when you see drains put in carelessly, failing. If you get a spot dug too low, it is bad. If on solid ground you can tamp in clay or gravel to fill it, but I would prefer to go down below and scoop up till I took it out, if possible. Never lay tiles clear up as far as you have dug, if you can well avoid it, on this account. You then have no fall to go and come on. Once, when digging through a deep bank, and in rather soft bottom, inclining to quicksand, we got a few feet of drain an inch too low. Something must be done, and that quickly, or we would have a cave-in. I was laying three-inch tiles, and almost without the loss of a minute I put in four-inch tiles, which we happened to have near by, in the low place. The inch would fill with sediment and still leave room for a full three-inch stream of water. This was about a dozen years ago, and this drain runs full, often, so it is all right. When digging a drain, if the subsoil is soft and inclined to mush up in water,



Tools Used in Draining.

as some of our gravelly subsoils do, if there is much water running, you should clean out close up to the spader, and let the water run off to keep the bottom as hard as possible to lay tiles on. I have some subsoil that will fairly melt when loosened up in water, which is so hard it is almost impossible to drive a spade through it.

Now, this suggests that to shove the spade through solid clay, you need to throw all your weight on it several times. This would be hard on your boot, particularly a rubber one, and that is the kind I wear for such work. To remedy this I got the smith to fit a thin piece of iron under the instep and ball of foot of my left boot (that is the one I spade with), turning up on the sides a little, with holes through to use a strap in, over top of boot, to hold it in place. It fits back against heel, and that helps hold it. With this on your boot, and the spade in with one edge out of subsoil, as previously described, one can send it down through pretty hard clay. I have got into spots where a pick had to be used, but rarely. An expert can spade faster than he can pick and shovel, nearly always, where a green hand would think a spade could not be forced through.

Quicksand is simply wet sand. I have little of this, but have struck some places. Now, if you can once get the tiles in, they will lay all right, as the land becomes settled. I have seen boards used to lay tiles on in such places. I should be afraid of them. And I find others in different parts of the State who have had more experience have done, and advise, just as I did. I graded through the place as well as I could and laid the tiles right on the sand, keeping off of them, of course, and taking great care in covering not to displace. I never used less than 3-inch tiles in such a place, 2-inch would not lie solidly enough.

In laying the tiles from the outlet up, of course, the water flowing in drain will run through them. Unless it carries some floating rubbish with it, I fear nothing from this. The sediment in the water, with reasonable care, does no harm. It will settle between the open joints. You must prevent floating rubbish from getting in tiles, or frogs, etc., when you leave the ditch for a while. I have always used for this purpose a twist of old dead blue grass from the fence corner, putting it in end of tile, not so tightly but that it will let water work through. The twist should be doubled and the doubled end stuck in and the other ones bent around outside, so it can not wash in itself. Lay a tile on one end to hold it. All these little points seem very simple to an old ditcher, but we all had to learn before we knew. I am indebted for much that I know to a thoroughly good workman, who learned the trade in England, and did some draining for me before I moved on farm. He taught me how to use the spade, and cut the ditch narrow to save labor—make skill take place of mere strength, and many other things. His name is John Winborn.

He is now living in Iowa, and if he should see this I want him to accept my earnest thanks for teaching me to be thorough in every little particular.

In digging in our bowlder clay one will now and then come across a big stone right in the way. I got it out if easily done ; if not, dug around so as to make an easy curve, and laid the tiles around. I always select, when unloading, the most crooked tiles, and keep them to use on curves.

Although I always use water to grade with when I can, I have got into places where I could not, as when laying those drains without any outlets. If I used water I had to dip it out at lower end. A good level to use in such a case is a triangle of light strips, about half an inch thick and two inches wide. The base should be half a rod long, or mine is that long, then I put a cross-piece on like that on a letter A. Then set the triangle on a floor perfectly level and hung a string from the top and put a weight on lower end near bottom, and when this plumb line became still, I marked on the cross-piece exactly under it. Then I raised one end of triangle half an inch (one inch fall to rod) and marked under string, etc. With this, one can tell just the fall he is getting. It is cheap and home made and accurate, if you have level to try floor with. But it is a bother to use it if wind blows. A little level such as is fastened on a square by carpenters could be used on cross-piece and marked for right grade. But water is safest and least trouble generally.

The illustration of the tools we use is from a photograph. The spade shown is a 12-inch one, a size smaller than what we use in regular draining. Our 14-inch ones were too much worn to sit for their pictures. Notice the iron to put on your boot.

# CHAPTER XII.

## OTHER POINTS IN DRAINAGE.

WHEN you are draining a field it is well to make a map on paper or a board, showing the location of each drain. A map like this, made to a scale, is a nice thing to look at, and if any drain should give out, or you wish at any time to put in additional laterals, it will be quite a help. Where the field is very regular a farmer might make this map. In some cases it would require an expert, and, perhaps, would not pay. I made a rough sketch of my drains, showing general direction of each one, number of laterals, etc., from which I can find one without much trouble. One will forget, however. I dug a full hour to find a main this spring that I thought I could put my spade right over.

It is no easy matter to fix the outlet to a drain so it will keep as you leave it. After much experience, I do not recommend laying up in masonry for ordinary cases. It is costly, and must be very thoroughly done to stand frost and action of water, crabs, etc. As usually done, it is soon out of fix. If you lay your common 12-inch-long drain tiles at the outlet, and simply let them come out into an open ditch, without any protection, some of them will be displaced soon by frost and water, the outlet more or less obstructed, and, perhaps, a regular mud hole or quagmire will be formed, particularly if cattle are around. Every spring you may go down and take up two or three tiles back to where they are in place, and clean out a course for the water, and thus your outlet slowly works back, but surely. I know, for I have tried it. I have fixed mine late years in a quite satisfactory way—the best way, I think, take cost and everything into account. I got two-foot lengths of sewer pipe, say three for each outlet, of same size as tiles. This sewer pipe has a collar at one end of each pipe, or socket, into which the end of the next piece fits. When laid, frost cannot displace so but what the water goes through. I put these three at the end of drain, and built up around outlet with heavy sods. If it is much of a bank, and no cattle around, these keep in good order some years. One simply needs to clean the open ditch below mouth of tiles every spring, or see it is clean.

I have one outlet that is nearly always under water. It is into a ditch that is seldom dry. I do not see but this works just as well as the open outlets. Sometimes the ditch fills with sediment above the level of tiles. It isn't all on my land, and I cannot control it. I do not see as this makes any difference, as long as I keep sediment away from mouth of tiles, so the water can flow out. If the bottom of ditch is a foot higher than outlet, six feet from mouth of tiles, I can see no harm done. The water brings the sediment out and deposits it in this little space and under water. I used to worry some over this state of affairs, but it is all right. There is, however, good fall to the drain, and it is rather small for the water to be carried, and usually, or often, at least, runs full. This outlet in time of a flood is two or three feet under water.

Now, how shall we fix the outlet to keep frogs, etc., out of drains? This I have fussed and worried over a good deal, too. I have tried most every kind of screen, or way of fixing them. There is one great objection on my land, at least. Little rootlets come down in the water and fill up screen and stop flow of water. I cannot practically use a screen fine enough to keep mice out. Such things with me work best on paper. I have been led to doubt actually whether writers who advise this plan have really tried it. It sounds all right and they put it in. Well, I have a screen over the outlet of my cistern overflow drain, to keep mice out, but, to tell it just as it is, I haven't had any over the other outlets for years, and I have had no trouble. Perhaps I shall have, but I had rather have once or twice, rather than to have to run to the outlets every time it rains and see to the screens. To fix my cistern drain I made a little frame like a slate frame and covered with copper wire screen. This I set firmly up against end of tile and drove down a stake on each side to hold it there. At the end of my land drains I would have to take it up and clean it soon after a big flow of water started in summer, or there would be trouble. I suppose little stray rootlets get in joints and water brings them down; not many, but enough to clog a fine screen. I have heard of frogs going up into a drain and making trouble, but mine seem to have more sense thus far. You will very likely put screens over your outlet for a time, as I did, you new beginners, and then let it go as I do. Now, see if you don't.

To locate your main drain I would go out in the spring, when water was flowing, and stake out the line of natural flow. Then I would straighten this as much as I practically could, without making much extra digging. The line of a natural water course may be quite crooked, having often many short crooks in it. Long curves will do in a main, if necessary, but avoid short ones. My side drains run out from the mains, usually at right angles, and directly up the slopes, or as nearly so as is practicable from lay of land. The above is for regular work. Sometimes, to drain a depression above, it is necessary to run the main not in a water course, but through a bank. In draining my twelve acres near town, before I came on the farm, the main began at an open

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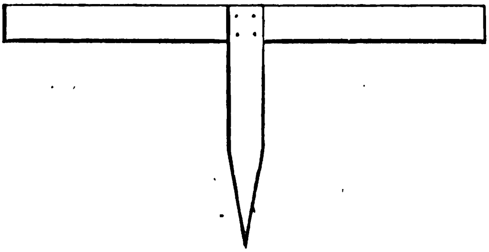
ditch, some two feet deep, and gradually went deeper into the earth, until it reached about six feet, and then gradually became shallower down to three feet. This was the best outlet to be got for the whole field. The front part was slightly lower than the middle, but could be carried through to the back. When there is no water flowing in natural courses, or you wish to run a drain out of the natural channel, as above, or when you are in doubt as to the fall to laterals, use a carpenter's or mason's level to settle the matter. The way I did was to get a good "straight edge" about ten feet long. A board one and a half inches thick and about eight inches wide was used. On this, I nailed in the centre, at right angles, for a foot, a strip of board of same size, about four feet long and sharpened at one end. Of course, the other end was nailed on straight edge, as shown in picture. The upper edge of straight edge should be perfectly straight, or as nearly so as a good carpenter can plane it.



Straight Edge for Leveling.

I take this straight edge to upper end of drain I am in doubt about and stick foot in the ground firmly and so the level on top shows the straight edge to be exactly level. Then I sight across straight edge, after taking level off, and have some one to hold up a pole at lower end of drain. They mark on this the level of top of straight edge, and then bring it to the straight edge and mark the height of that. The difference between the two marks shows the difference in level or the fall there is. I have used this simple device much, and with care it can be made to give almost the exact fall between two points. If you want to get the difference in level in draining a depression, where you have to go through a bank, why place the straight edge on the highest point and level both ways. If the distance from the ground to level line is, say, six feet at upper end and nine feet at lower, why the fall between the two points is three feet. If you cannot see through, the line is so long, level twice. You need no surveyor or other instrument than this, at least I have not. I have never trusted my eye very much, but rather the straight edge, level, and pole and rule, and the water when we come to grade for tiles has always run the way we laid out for it to. Be careful and you can do your own laying out, except, perhaps, in case of very large fields, with very slight fall, where the greatest accuracy is needed.

I have not found any need of having silt basins on my place. There is fall enough, I think, to always carry all sediment out of any length drain I have. On level land and some soils these are thought necessary. They are simply little wells, into which the tiles empty, and then the water flows out on the other side into another line. The silt settles in well and can be cleaned out. They are usually built about two feet deeper than the tiles are laid—those I have seen. By the way, do not get the impression that I have done any very large amount of tile draining. Writing so much about it, you might be led to think that I had done a great deal. I have not, but have had to do a little of most every kind on my farm.

The water goes into the tile drain through the joints practically. You will hear some object to glazed tiles, saying water cannot get through them. I have never been able to lay a drain so tightly that water did not get in all right. I lay them just as tight as I can. I have heard men say they laid the tiles one-eighth of an inch apart so the water could get in. One manufacturer told me last winter his tiles were so well made that if one laid them in a straight drain and tightly as they could they would swell so tight no water would ever get in. Well, he thinks so, but I don't believe he ever laid many tiles. I prefer glazed tiles, because I know they are hard enough. The softer or brick tiles are generally all right when properly burned. I would not lay any of them without striking them together, where their color leads me to doubt their being hard enough. If they ring clear and sharp they are good. If they give out a dull, dead sound, throw them away. You can also detect a cracked tile by the sound when handling. You cannot be too careful to avoid getting any into your drains, but sound, hard burned ones. If you will use cracked or doubtful ones, let it be at upper end of drains. Where a little piece is broken out, I use them at upper end, and cover hole with piece of broken tile.

As to the depth tiles should be laid there is great difference of opinion. I find men who declare water will not go down in their subsoil to tiles three feet deep; that they might as well throw the tiles away. They are probably right as they manage, but I should expect, if I kept all stock off land and clovered in rotation, that drains of that depth would be all right in time. Shallow drains will, undoubtedly, show good results quicker, on certain soils, but I should have no fear but what I could drain deeper any soil that was fit for cultivation. But circumstances do alter cases very greatly, and, perhaps, you had better be governed by local opinion until you have actual experience of your own. I would not lay down any cast-iron rules. And still I can show you some of the meanest, toughest blue clay in Ohio, drained three feet deep or more, and the water gets down all right, as I use the field; the drains drawing well a rod or more on each side. I know men who advise laying tiles no more than twenty inches deep, or even less. I should be slow to lay less than two and a half to three feet deep. It is some the same with this matter as with covering the tiles. A writer in *The Ohio Farmer*, just to hand, claims no water will go into his tiles if they are covered with clay; that water will stand right on the tiles when nearly all the earth is removed. All the same, I believe I could drain his land with tiles put in as I put them, and do it thoroughly and in a way that would last. However, I may be mistaken about anything but what I have done. But do not draw hasty conclusions from slight experience and without much thinking. Water standing right over a tile drain after it is put in does not prove that the work is not well and properly done.

I believe that in some sections tiles may to advantage be laid deeper than three feet. In many soils, at least, the deeper laid, the further they will draw. On my land, the last cut was about as hard to dig as the other two, and the fourth would often be a terror to get out. We must be governed as to depth somewhat, by the hardness of subsoil. It may be cheaper to put drains a little nearer and not so deep. On our heaviest clays, two and a half to three feet deep will usually drain well about two rods wide, or one rod each side of drain. In lighter soils, three or four or more rods apart will answer. About the size of tiles for main drains I do not practically know a great deal. They should be large enough so no water will stand on surface, more than an hour or two at most, and still I would not want them so large they would not be crowded now and then, so as to clean them out thoroughly. I like to see them run just as full as they can carry, in extreme wet weather, for then I feel they are all right. I do not know just how large, per acre drained, they should be. And I am inclined to think, from the different views among authorities that the same rule will not hold good for all soils. And the amount of fall has much to do with size of mains, of course. The greater the fall, the faster the water will run, and the smaller tiles may be. I will give the opinion that on my soil and with the moderate fall that I have, a 3-inch main is sufficient for three acres, a 4-inch for five and one-third acres, a 5-inch for eight and one-third, and a 6-inch for twelve. My land, I think, averages a grade of at least three feet to the hundred. Some advise larger tiles than I per acre and some smaller, and, perhaps, both may be right for their soils and rainfall. I have only given these figures as my judgment for my soil, to be varied as you may think best for your latitude, or as a little guide to start you when you have no experience. As to the size of laterals, on my rolling clay, 2-inch are all sufficient. In the western part of State, on more level black soils, they now use nothing else but 3 or 4-inch. Both are right. The conditions are different. They have very slight fall, almost dead level sometimes, and often very long laterals.

The first drainage in a new country is often done with stones, if they are plenty, or with boards where lumber is very cheap. It would hardly seem possible to our Ohio farmers, but I was in sections last winter where lumber was so cheap and tiles simply not to be thought of, that there is no doubt of the wisdom of draining temporarily, to some extent, with boards. I have had several letters lately from farmers, asking how to do this. Practically, I know nothing about draining with stones or boards, but I feel sure this book may reach some sections where tiles are yet unknown and will be for some time, and where there may be some wet spots that the owner will want to drain badly, and where lumber is worth but little more than we pay here for getting it sawed. For benefit of such, I quote from an editorial in *Country Gentleman* of recent date:

"The simplest mode of construction is to secure inch boards, six inches wide, and nail them together at the edges so as to form a trough, to be inverted in bottom of ditch like an inverted V. * * * Well excluded from the air, durable kinds of wood may last ten or fifteen or more years."

But I was to tell you how you could tile drain your farm and not run in debt, a safe way for everyone to go to work at it, a way I can advise and from practical experience, too. You can, any of you, manage to get tiles enough to drain an acre or two, say two acres. Suppose you start at the natural outlet of a field, or part of your farm. You decide where mains and laterals should be, just as though you was intending to drain the whole thing, and on size of tiles, etc. Then you buy enough to lay the main a little ways and its laterals, until the two acres are thoroughly drained. Maybe you can go without tobacco or a new overcoat or something so as to buy the tiles. I have always done the former and sometimes the latter. You can manage that little matter anyway. Then study over this little book carefully until you know just how to do. If there is a really good expert ditcher in your vicinity go and watch him a while; but if he is a careless workman I had rather you keep away. You can do the above in very stormy days or winter evenings to get ready for spring work. Then you can for once work some pretty bad days with your man or sons, laying those tiles. If you have interest enough to get this book and read it, you can do this much if you will, and I predict after you get a going, you will become quite enthusiastic. It stirs one up to see the water run out and the land become settled and firm. Now, plow your field and crop it, the drained part the same as the rest. If you have done your part well, you will have a decided gain in yield. You may get ten or twenty bushels more wheat or corn per acre. It would be well if you could manage to drain the worst parts first, because then you would see the greatest results. Whatever excess of crop, you feel you can surely charge to your draining, save the money when you sell it and invest in more tiles. I know one young man (I have his letter now before me) who drained a few acres himself, and raised twenty-eight bushels wheat per acre, the first crop, where twelve was all that could be grown before. But such results will not always come so soon. With your regular help, at odd spells, you can manage to lay the tiles bought with the excess crop money, or perhaps you can hire help a few days. I have worked, friends, days when not one farmer in fifty would be out, at just such work, because I was determined to get a start some way. After two or three years, more crops will bring more tiles, and more tiles more crops, and more crops more tiles and labor, until, first you know you can drain the last acre, and then you can take the money to build a new house, or replace the old overcoat, or send the good wife on a trip. It will go hard at first, but easier and easier. You have watched a heavy freight train start on an up grade. You think at first it can never make it, but slowly and surely it gains and gathers headway until it glides along almost without effort, as it seems to you. This is the only way to improve your farm, that I dare advise, and you are just as certain to conquer as that locomotive, and you will be more of a man for having done it.

Why, I remember when I was draining, one cold, nasty day, a a poor farmer came along and stood with his overcoat on and head drawn down in it, and his hands in his pockets. I knew just what he was thinking about me. There isn't a foot of draining done on his farm, and never will be, if he has to work for it as I did. But I slept sound and good that night, and ate all I could get. We enjoy things by contrast. Work in bad weather makes home and its comforts wonderfully pleasant, for the short time given to it. But then I had got to conquer *any way*. Times are going hard with that old friend now, while they are getting easier and easier with us as we get less able to push things with so much vim.

I am told sometimes that the hired men will not work at tile draining; that they think that is not proper work to set them at. I do not know how this is, for I never set any at work. I just take my tools and go right along with them, and never had one that objected in the least. I suspect some of them would if set at the job alone. Then I try to show them how to do the work neatly and skillfully, so as to make it easy for them and to interest them in the result. There is a good deal in management.

# CHAPTER XIII.

## TILLAGE.

WHAT do we till for? To bury a sod, destroy weeds and grass, fine the soil so as to make a better seed bed for plants and sometimes to compact it, to prevent a crust forming, or, in other words, to let in air freely, to check evaporation of moisture and sometimes to hasten it, to prevent water from flowing off on surface and cause it to soak straight down, to bring new particles of soil in contact with each other, and in general to set free more of the plant food that is locked up in the soil. These are the main reasons. Let us take them up in regular order. The plow is the first implement to use. With this we can turn over the sod and bury the corn stubble or loosen up the settled earth to a depth of 6 or 8 or even 10 inches, thus letting in the air, and then we have the foundation laid for the other operations. There is a tendency towards stirring the ground more hastily and less thoroughly of late. Be careful that this is not carried too far. No other implement can do quite the same thorough work of the old plow. There are many styles of plows, and as many of plowing. One man wants a sod furrow turned over flat and smooth, and a plow that will do this, that has a long mould board and hence easy draft, is his plow everytime. But now I would not take such a plow as a gift. I want to turn a lap-furrow, so the rich surface may be scattered through the soil more, and not laid flat on the subsoil, and I want a shorter, blunter mould board that will leave the furrows just turned so they will not come back, but lying up rough and loose. Such a plow draws a little harder, but it does the work wanted. With a field plowed like this, my Thomas smoothing harrow used in time will, with my weight on it, do a large amount of pulverizing in once passing over. This harrow would hardly touch the same soil turned over flat and smooth. I would then have to take the cutaway or disk to loosen it up in the shape the plow might just as well have left it in. I do not want and will not have an inch skipped when plowing, and still my field looks very rough when plowed, as compared with some, and perhaps the other fellow thinks he is doing a nicer job than I. But I am after the most net dollars.

Of course, for such plowing, and for all on our farm, a jointer should be used on the plow. This is simply a very small plow ahead of the big one, that skims along two inches deep and throws sod or rubbish into the furrow, where it is buried. Without this I could not well plow as I do. Too much grass would be on the surface. Now I have only clean, mellow soil to harrow down. If one side of the furrow edges that stick up had grass on, it would make a pretty mess. There are fields this wet season that now (June) are green with grass nearly all over. There is hardly a spear on mine. Difference, a jointer sharp and properly set. Besides, if a sod is all buried you get all the plant food; if it isn't, you do not. Then loose bits of sod are in the way of using a smoothing harrow or weeder on corn or potatoes, and look badly. I make it a rule to be at home and tend to my business, but once did go away to speak when my man was plowing. He had worked for me before and I got him started all right. But the plow got to going wrong and the jointer did poor work, and when we got through harrowing, my field was spotted with bits of sod. Well, my man was kept for a day or two picking up the bits. Five minutes' time and a little care and gumption would have saved all this; but the care and gumption had gone off lecturing! I figured that I lost more than I made, as usual. I never yet had a man that could set a plow right and keep it so, or fix it if it didn't go just right. A good plow should run itself for rods at a time, with just a touch now and then. It should not be "held," much less wrestled with, as is often done. I speak only of walking plows. Sulky plows are not the best for our small fields and soil.

Many have been sold in this town, but one by one they drop out of sight, and those who praised them highly at first, fail to use them any more. I have never yet seen one that did as perfect work all through as we do, and, of course, they take more power. If I were old and lame I might use one, putting on an extra horse; but my men are young and can walk cheaper than I can furnish an extra horse. I use, and have for years, an Oliver chilled 40 X plow. It was the only one I could find that would do good work ten inches deep in my soil.

We never use a plow at all without a wheel on it to regulate the depth. In riding through the country I see many do not have them on. One man told me, "Well, I guess I can hold a plow myself yet," when I asked him why he did not use a wheel. Yes, he might spade the ground and not get a plow, even. The wheel gives one a uniform depth of furrow, just what you set it for, if the point is sharp, and repeated experiments have proven conclusively that the wheel decreases the draft. Instead of wrestling and laboring to "hold" a plow, get proper attachment sand set them right and walk along easily, whistling, and guide it with a mere touch now and then. "How would your wheel work among the hills when plowing potato or corn stubble?" some one will think. I would not have the hills. Nearly level culture is best for drained land, and all land should be drained for these crops. And then it is a question whether it is best to use a common plow to prepare potato and corn stubble for wheat or rye. In most cases a fitting of surface is better. I never plow but once in my rotation. The clover sod is turned under and then the potato stubble is surface worked for wheat.

But now I have hinted at deep plowing; for fear I may mislead, let me say that for my soil for potatoes I like deep plowing; but we have been twenty years gradually increasing depth. I would *not* plow so deep for corn. This subject will be more fully treated in chapters on potato culture. How about subsoiling? I have not been able to see any good results from it on my soil. I got a subsoil plow and used it on parts of fields and watched results, and it now stays in the tool house, year in and year out. I had my doubts whether this tool would pay. Just passing this through the subsoil once, breaking it up into chunks, and leaving it coarse and rough, which is just what it did on the clay, could hardly do any good. If I could manage to thoroughly fine and pulverize eight inches of subsoil, under the eight or ten inches of top soil, I would do it and expect good results; but this I could not do. Some of you may not understand what this subsoil plow is. It is an implement to break up the subsoil in the furrow left by common plow, but does not, of course, bring it to the surface. You plow right along with common plow and have another team following with subsoil plow. There may be soils and conditions where it will pay. I can only speak certainly for my own farm.

I never "plow around," as it is called here, tramping down the corners where I turn on plowed land. I back furrow, starting in the middle of a strip and turning to right (right hand plow), leaving ten feet head lands at the ends to draw the plow on until the last eight or ten times around, when I plow on ends as well as sides. This plows the field without turning on plowed land. Then next time it is plowed (in three years) I plow down outside, turning to left (leaving ten feet headlands), drawing plow across end, back up other outside, drawing across other end, and so on. When I get done I plow headlands all one way, throwing earth out and drawing plow back. Thus ground is kept level, and tramped on after it is plowed but very little. With care to come out right, the dead furrow is made right where the back furrow was before, and when harrowed down the field will be about level. There is a little waste of time in this, while drawing plow across ends, but I will get enough more crop to several times make up for it, and then one can slide across ends quickly, and it rests the horses. I plow a strip fifteen or twenty rods wide all in one land like this. It looks so much nicer than to have a number of dead furrows. Of course, this is for drained land. My next neighbor has heretofore plowed in several lands. This spring he plowed the whole field next to mine in one land, and it looks nice, and there is no waste and no corners tramped to death. I am careful to turn no wider furrow than the share can fully manage. My plows will turn sixteen inches wide, fairly well to look at after it is done, but they do perfect work and more pulverizing at twelve or thirteen inches, and I see that they are set so they go no wider.

Now we come to cultivation. We harrow and work the plowed land to make a good seed bed. Roots feed by contact with the particles of soil. The finer these are, the more feeding ground. There is more surface in a pound of shot than in a pound of bullets. The mere making of the surface fine in which the seeds are buried is not enough. For the best results it should be pulverized all through the soil where the roots will go. With the ground reasonably dry one can hardly overdo this matter. One more passing over after it is already well done may pay better for the time spent than what you have done before. We have implements now that do different kinds of work in this line fast and well. One needs several. The Thomas smoothing harrow stands first on my farm, used as above described, before soil dries hard, or after a shower, when it is just dry enough. With three horses and my weight and a heavy plank on three sections (10 feet), it does some work. Next, I would place the cutaway harrow or a disk. I rather prefer the former. Have both. These are digging harrows, to use after ground is settled by heavy rain or rolled down, or to make a seed bed on tough sod. They dig and work without turning up the sod when ploughed well with jointer and rolled down. In this respect they are better than spring tooth harrows and cultivators. The roller is indispensable with me to mash clods which the harrow brings up. Alternate rolling and harrowing, first with cutaway and then smoothing harrow and then roller, and then back to cutaway again, etc., will make a seed bed in time that is right. The Acme is a good surface pulverizing harrow. It will not dig deep. After the corn and potatoes are planted, then the smoothing harrow will keep weeds from ever getting out of the soil, save the plant food they would eat for the crop and save you hoeing by hand, and do it all cheaply. This work must be done, of course, in time, then it will pay grandly, and while you are killing weeds just as they sprout, before they have harmed you, you are also letting air into the soil by keeping the surface stirred, thus giving Nature every chance to help your crop. After the corn and potatoes are up, so one can follow the rows, then Breed's weeder, a very light smoothing harrow, will do better than the Thomas to prevent weed growth by constant stirring of surface and also to check evaporation in a dry time. More particular directions for the use of these will be found in chapters on potato culture.

Next, the cultivators are used. As with the plows, so with the cultivators: I would leave the sulky cultivators for the large fields and cheap lands of the West. With a large, long field, one can afford to leave a headland at each end to turn on, as he needs with a sulky cultivator. We cannot afford this on our small farm and valuable land. With a one-horse cultivator we can turn at ends where rows come right up to fence, as nearly as we can plow, and hardly injure the end hills any. A good horse will soon get used to it, if carefully taught, and do almost no injury in getting around. But it is simply impossible to turn in this way, several times in a season, with a team and wheel cultivator, and not do a good deal of damage. It is a common remark that the sulky, or two-horse cultivator, gets along twice as fast, as it works both sides of a row at once. In practice, we do the same with one horse, by having rows straight, as we work up to the plants on both sides of the cultivator, and we do it better than it can be done when riding. I believe I know what I am talking about, too. I have carefully tried the two-horse cultivators. I can use one once or twice to stir soil, and do pretty well, but I can do better the season through with a light one-horse tool, with very narrow teeth. We use the latter two or three times in potatoes after a sulky cultivator could not get through. There has been great improvement in sulky cultivators, however. The first one I bought had teeth about six inches wide, and it nearly killed a man to guide it with his feet. The last one—the Hudson Bicycle—has narrower teeth, and is guided by the slightest touch, and comes much nearer to one-horse cultivator work. There has been also great improvement in one-horse cultivators. The first one I bought had three teeth, each five or six inches wide. I soon sold that to a less progressive friend, who didn't want anything better so much as he did something cheap, and got cultivators with five teeth, and they only three inches wide. Then came 1¼-inch teeth only, and now I have just got one with a larger number and even narrower ones than this. All this has come about regularly. The wide shovels were used before the harrow was common to keep weeds down. They would cover them up more, and they would hill up more. Now, with level culture and clean land, we only want to stir the surface, just harrow it, and let it drop right back level.

In one respect, however, I do believe the old wide shovel cultivators were best. They moved the soil around more, brought new particles in contact with each other more. I certainly think, from long observation, there is something in this. I would prefer to use wide teeth once in a season. We have them. If using a cultivator on fallow ground, or in preparing for a crop, I would prefer wide teeth for the above reason. I use a scraper in the potato field for the same reason, as will be described later. I spoke of tillage to compact the soil. You understand when that is wise, and when not, doubtless. It is generally best to firm it all you can for winter wheat, provided it is done always when dry. This, with shallow drilling, induces a surface growth of roots more, which will stand freezing and thawing best. I would make soil almost as fine and compact for corn, if ground was dry, but I would not think of doing it for potatoes. Roots grow best, as a rule, in fine, firm soil, but, if one makes it firm early in the season for potatoes, it is likely to get settled and hard, so the tubers cannot expand readily, and one cannot loosen it in the hills. In a very dry spring, however, we take this risk, and firm the ground to insure a better start. I like the ground made very fine and firm in dry weather where I am going to set out strawberry plants. I use the harrow and roller alternately to make it firm after it is fine enough. Plants can be set out in the driest time in such soil, and grow right along without any watering. But not a bit of firming was needed this year, with any amount of rain to settle it. One must be very careful not to compact wet or even moist ground, unless it is sandy. Do the best we can, we will make mistakes often, but if we understand just what we are working for we can certainly average better than if we do not think at all. Let me tell you, for your encouragement, of a little mistake in tillage I made this year. We put in part of our potatoes the last week in April. It was plenty dry enough. I have always made it a rule to not roll any faster than we plant. (We always use roller just ahead of planter.) It is not safe. Rough or harrowed surface will hold heavy rain better and dry off quicker. Well, Saturday after we had got part of potatoes in, the prospect seemed so favorable that I told my son to roll the rest of field ready for planting first of week following; I would take the risk. I was anxious to get them in as soon as possible. Part of that land laid there for five mortal weeks before we could use a harrow or cultivator on it, as it rained almost constantly. I lost money by it and considerable of self-respect. I knew better than to take the risk.

Now this leads naturally to another point mentioned in the beginning of this chapter—tillage to prevent water from flowing off on surface and cause it to soak down and pass off through tile drains or through a porous subsoil. Thus we save the fertility in it and save surface wash of some of the finer particles or our soil. More water ran off that rolled field than off of the rest. In fact, none practically ran off of the other. The rougher surface held it until it could soak down. We did not happen to have any great pour downs or many tons of water would have ran off from the higher portions of lot and accumulated in the drained low places, giving them a great excess. During the wettest times I send practically no water from my cultivated land to the river, except the steady flow from tile drains—filtered water that has paid full toll to my crops. When cultivating, all through the season, we work with this end in view. We strive to have a loose surface, and nearly level, to catch the rain and hold it from running off. Of course, a heavy thunder shower on rolling land will get away from us some, but we can do a great deal better by being as careful as we can be on this point. Just the moment that it is dry enough we start to work. A man may say, What is the use of starting? it looks as though it would rain again soon and you will have to do it over? We do not care how many times we do it over. If it doesn't rain soon, why we save moisture; if it does, why then we catch more and make it pay tribute to us.

One point was omitted above in regard to use of the disk or cutaway harrow. The great objection to them is that they throw earth something like the plow and get the surface out of level. I have seen land put in bad shape with a disk set to go as deep as possible. The ones I use throw soil out from centre, and, used without lapping, you have a ridge every six feet, and a depression between. The cutaway does less of this than the disk. If used quite straight neither throws as badly; but the best way to use them both is back and forth through the field, lapping half; with careful driving you can leave land very nearly level. And I would prefer that this disk work should be crosswise of field; then if you get it a little out of level, a smoothing down lengthwise will make planter and drill work well. If you disk harrow the same way you drill or plant, you will not level the field as well. Do not disk diagonally—that gives a wavy motion to drill—but squarely, crosswise.

Keep your smoothing harrow teeth sharp. Mine are steel and I get them tempered when they are sharpened. A sharp tooth will do much better work on potatoes or corn. When it becomes as blunt as the end of your big finger, as many in use are, it will not take hold as well and is more liable to break crops off. I have never sharpened my disk harrow. But Mr. J. F. Pond, of Olena, O., writes me to "get them sharpened on an emery wheel, where saws are gummed. This costs $1 for a good job, and harrow then does as good work as when new. Three good 8-inch files, and lots of work, will do nearly as well. We have the second one nearly worn out."

# CHAPTER XIV.

## TILLAGE—THE EARTH MULCH.

TWO of the most important points in tillage are left for this chapter. The first is tilling to check evaporation. When you put a lot of leaves or some strawy manure or some sawdust or muck around a tree that you have just set out, you call it mulching. You do it to keep the tree roots moist. If they get too dry it will die, hence this precaution. Perhaps in the early summer you hoe around it for a time, and then mulch around before very hot, dry weather comes on. Now, how does this mulch work? It prevents the air from rapidly absorbing the moisture. It doesn't do it because it cannot get at it much. Now, do you know that you could accomplish the same end, perhaps, just as well if you would take a rake or hoe and keep the surface of the soil about the tree constantly loose? If you would never forget, but always do this, stirring it, say, two inches deep after every rain, just as soon as it was dry enough, it would practically save the tree just as well as the mulching. I have tried it several times on trees and shrubs, and no matter how dry the season, I can keep them growing just as well anyway without the mulch as with it. Mr. J. J. Thomas, than whom we have no higher authority, says there is no better mulch possible for newly set trees than a freshly stirred surface. But now, in the case of trees, it would be less trouble to put some mulch around them and have done with the work once for all, particularly if there were but few. If you had a large number, and the field was in cultivation, the earth mulch might be cheaper. But for our ordinary field crops, for corn and potatoes, etc., the earth mulch is the only practical one to use on a large scale. And we may make it about as effective in a dry season as a mulch of straw. Do not believe this? I assure you it is so. And it has this advantage: A straw mulch in a wet year keeps the ground most too cool and wet sometimes. The earth mulch is safer and better.

But let us look a little further before going on with this point. Where does the water come from that your crops use during the season? Some comes directly from the clouds. Now and then there will be, perhaps, weeks that enough comes in this way to supply the crops. But at other times they must get water in some other way or suffer. You say, perhaps, "Why the soil holds moisture and gives it up to the crop as long as wanted." This is true and still we need to understand just how it is done in order to properly take care of our crops. Light showers and even quite heavy ones in the summer only wet down a few inches; but during the wet weather of spring and fall, and at other times when there is much rain, the water works down through the soil and subsoil. There it is stored, way down below the surface, in vast quantities. We sink a well down to get water to use. In a very dry time we hear of wells getting low and even failing. Down below, then, is the great store-house for water, and this is what we draw on for our crops in a dry time. Does not tile draining, or any draining, diminish this supply? you may ask. Somewhat, of course. In a previous chapter I told you that Col. Brigham said draining had affected the shallow wells in his county. It must also diminish somewhat the quantity of surplus water that can be drawn on in a dry time. Regular tile draining of large areas must give less water in the earth beneath to draw on in case of a very long-continued drouth. But still enough will work down by the drains to answer all ordinary purposes. I should not be at all slow to drain on this account. Right here you may see an objection to surface drainage. It not only carries fertility off, but gives the subsoil, deep down, little chance to fill up with water. I am exceedingly careful on my farm to hold the water, and let it soak down, so as to lay up all I can for a dry time. The level culture helps about this, but particularly so does a growing crop on a field during the winter, rather than bare stubble. No water much can flow off of my clover with clippings on the surface, or with the second crop harrowed down to plow under in the spring. A depression east of my house used to fill up with water *always* in the early spring and often in the fall, the water running down the hills around. Now it never does. I hold the water where it falls and make it soak down.

But now we have a good lot accumulated below—how does the crop get it? We drain the land to get rid of the surplus in the surface two or three feet deep that would injure us—how do we draw on the supply below when needed? Roots go down to it to some extent, but what is known as capillary attraction gradually brings this moisture to the surface. This force is of wonderful value to the farmer and he needs to fully understand it in order to make it his servant. You dip the lower end of a sponge in water and it becomes wet all through. When I was a boy I used to study capillary attraction by dipping a piece of loaf-sugar in water just a little and watch it rise up. This experiment always ended in my mouth. The oil is brought up to the flame in your lamp in just the same way through the wick. Dry earth set in water at the bottom will slowly moisten up. The water rises through what are called the capillary tubes. These need not be straight at all any more than in the sugar or lamp-wick. This is a grand provision of nature that makes water able to and obliged to rise above its source among the particles of soil.

Without it a good crop would be very much a matter of luck. With it one may be quite successful without much rain directly from the clouds. But he must know how to do it, or he will not get the best results. Nature gives him the chance to manage to his own advantage, but if left to herself she will be very wasteful. "By the sweat of thy face shalt thou eat bread." There is a way to get dominion nearly always, but we have got to work for it. You can eat wild grapes for nothing, or thorn apples, but you have got to work for Catawbas and Baldwins. Just so in tillage. You can get some help from capillary water, free to the most careless, but you cannot make it bring you success, when the multitude fail, without systematic work.

Now we can begin to see better why the mulch of strawy manure or sawdust around a tree will save it in hot, dry weather. Capillary attraction is constantly bringing up water. If the ground was uncovered and hard, unstirred, the air passing over the surface would dry the moisture out rapidly and the supply would diminish in time, so the tree would die, perhaps. We put the mulch on and this keeps the air away pretty much and the moisture is saved for the tree. The waste into the air is prevented. The mulch is coarser than the earth and the capillarity is broken when the bottom of the mulch is reached. But for this the water would come to the top of the sawdust and be evaporated just the same. Capillary attraction works only in *small* tubes, very small. The word means minute, hair-like. The smaller the tube the higher water rises in it.

Now let us come to the subject of this part of the chapter—the earth mulch. When you stir the surface of the soil after it has been settled by rain, with rake or harrow or cultivator, you break up the capillary tubes, so to speak. The rain has settled the earth altogether, making the capillarity about the same to the surface, and the water is brought clear to the surface and is rapidly taken up by the air. You move this soil to the depth of an inch or two and you make it coarser, less compact, and the water that is constantly rising from below stops from necessity when it reaches the lower part of this stirred surface, this earth mulch. It is true that the inch or two that you stir dries all the faster from being moved. You waste a little at first to save a greater quantity afterwards. But when that little has become dry it protects the great mass below quite perfectly. Of course, it does not do this entirely. Some air will reach the moisture and get a little, and there may be a slight rise to the surface ; but practically we may call this a perfect plan, it comes so near to it. It is a curious fact, but science tells us what any observant farmer can readily believe, that soon after a shower a cultivated field will actually be drier than it was before, if we do not stir the surface. The water of the rain, to put it plainly, attracts a larger flow upwards by capillary attraction, and all is evaporated and wasted. I think this is particularly true of light showers in very warm weather. After a few hours it used to seem to me, before I read the explanation, that my field was really drier than before, under the above circumstances. So he who is not on time in his making an earth mulch after a shower, not only loses much of that but even more. The question may be asked, How long will a stirred surface form a good mulch? Until it rains again, if that is within a week or so. Just as soon as it is dry enough after every rain you must prepare the earth mulch at once, if you want to do your best. By dry enough, I mean so dry that your team will not do injury by tramping the soil. One cannot help but waste some water, and tillage implements will not work well, until it dries a little. A day's delay may cost you money and may not, according as season may be afterwards. This we cannot know about and the only proper way is to be always on the safe side. If it does not rain again in about a week, I would stir again anyway, not only to keep weeds down, but to break up the capillarity, as the surface will soon settle together again after being stirred, and not be as good a mulch. "But this is lots of work," some one says. "I have been in the habit of cultivating once a week. Now here you tell me that if I have got this work all done to-day and it rains to-night I must do it right over again." Certainly you must if you want to do your best. I am writing about "our farming" and this is just exactly what I always do, and have done for many years, and it pays wonderfully sometimes. Of course, we do some work for nothing, some years, but there is no other way to grow a good crop when the mass fail and prices are very high as a result. Some cash returns that I could hardly credit myself, and that many others who have not paid attention to these points have unhesitatingly called false, have come largely from close attention to this one matter. Merely working a crop so many times in a season will not do any longer in this section. There is a right time to do it, and we need to understand just what we are working for in order to know when that is and then our knowledge must be put into practice. It is claimed on the lighter soils of Western States that tillage is not so important. I do not know. It is even said by some that it is of no use only to kill the weeds. The experiments at some stations would seem to give weight to this theory. It is possible that there may be conditions under which this is true; but they do not exist on my farm nor on a great many others. I would use this earth mulch on every crop I could, but it is more important for potatoes than for corn, for example, as the former crop needs water more. My fruit garden is mulched with straw, because it is less trouble, except the strawberries the first season of their growth. This first year we keep the earth mulch around them all the time and in the flower beds and around shrubs and trees. In the last chapter I speak of cultivation to hasten evaporation. Sometimes this may be wise. We have had an excess of moisture from the clouds for weeks this season. The earth even where well drained has been constantly too wet. When there came a drying day between rains I have gone onto my land when I would do some injury from its being too wet and cultivated just to dry it out a little before the next rain, or quicker, so we could do some finer tillage soon after. The drains prevented any water ever standing on surface, but weeks of rain kept the earth saturated and sodden to the last degree and we must help it to get rid of the excess and let the air in a little. But this is very seldom necessary, or wise. One better stay off of his land till it is dry enough, as a rule, and then push things. But once in a while he must choose between two evils, as much as he dislikes to.

There is one thing certain, a man cannot set a day beforehand to go fishing or to a picnic if he means to do his best in tillage. Such thorough work keeps him tied up. He can get plenty of time for recreation during the season, if he arranges all around, somewhat as we do—doesn't try to do too much, etc. But he must not set a day beforehand. I have made some friends quite angry because I refused to leave home in the tillage season, or to agree to leave and picnic with them on a fixed day. It might be just the very day when I ought to be forming 12 acres of earth mulch, and a day or two's delay might mean a large money loss. Business first. This very week I was invited to attend a meeting of the agricultural students at our State University. I much wanted to go, but felt it my duty to practice what I preach, and tend to the farm, particularly as the weather is exceptionally bad and moments when we can get onto the land precious. Let the men attend to the farm while you are gone? Yes, and let the soldiers go into battle without any officers. The master's eye at least is constantly needed. A very slight mistake, or a little carelessness or more likely not knowing from long experience just what was best, might cost me a number of dollars. And still I am not particularly after the money now; it is more because I do not like to come short of doing my best.

We do not wait until the crop is up so we can cultivate before beginning to check evaporation, not by any means, in an ordinary season. We can, perhaps, save much water before that time. Harrowing right after plowing helps, and again soon after a rain, before the crop is planted and after. Even if the crop is up enough to cultivate, we may harrow or use weeder first, because we can get over ground and check evaporation very much sooner. When one understands all about this it is surprising in how many ways he can help himself.

Now allow me to say a few words about tillage in a general way as a means of unlocking plant food in the soil that would otherwise remain inaccessible to the crops.

We have little poor land in this section, but we have plenty of unproductive land. Very often this unproductive land, or poor, as it is often called, contains an enormous quantity of plant food per acre, as analysis shows. The trouble is largely that the food is not in available shape. For some reason the crop cannot get much of it. My farm was in this condition when I came here. I could point you to many in the same shape to-day. Generally speaking, with drainage first as a basis to work on, thus getting the water out and the air in, thorough tillage will set free a good deal of this heretofore unavailable plant food. Pulverizing and fining and frequent working of the soil, always when dry enough, is a great aid towards bringing up the fertility of the farm. Years ago I wrote in *The Country Gentleman* something as follows: "Had I to take my choice between a given quantity of manure and tillage implements, such as we had twenty years ago on most farms, and half the quantity of manure and the best tillage tools of to-day, I would choose the latter for my farm. I do not care to change this yet. The poor plow (compared with the one I use now) and straight-toothed harrow that I began with did poor tillage. We can turn and stir and tear up and pulverize now in a way not possible when I began farming." The above statement was not made at random on theory, but from experience. To avoid making this chapter too long, I will not stop to give particular illustrations. You will find some in other chapters, particularly under the head of Wheat Culture. This reminds me of another remark made about the same time in *The Country Gentleman*, to the effect that more tools and teams would be a cheaper way sometimes to get fertility for the wheat crop than the buying of fertilizers. Of course, such statements roused up opposition from men who buy fertilizers largely, or sell them, and who do not do the most thorough work in tillage—who often spread over so many acres they cannot. I was sneered at for teaching that tillage could create anything. I had never said it could; but it can make more plant food available, particularly on drained, heavy soils. I wrote right from the tools and teams that were actually doing the thing and making the money. And I am glad to know, as I do, that I stirred up a great many others to better tillage. I have had any amount of letters during the past few years from friends who were doing more thorough work and getting their pay. I remember one friend in Western New York who, after reading my letters, decided to put out less wheat and give the less acres all the labor he had previously laid out on the larger number. I cannot now remember the exact yield, but it was over fifty bushels per acre, way above what he had ever done before, and altogether the finest crop in his neighborhood. I was in his town in the fall, and was told this by neighbors, who said there was no question about the truth of it. But I wish to particularly bring out this point: That the influence of good culture does not end with the crop that it was applied to by any means. When pushing the claims of tillage years ago, mention was made of a wheat crop of my own that paid, I think, about 100 per cent. net profit on the cost of production, counting in use of land and everything. I wrote that, to my mind, there was no question but what the thorough tillage given the preceding potato crop had much to do with the wheat yielding so well. I am yet of the same mind. It is well to bear in mind when tending any crop that we are not working for that alone. The constant and thorough tillage in corn and potato fields may be made to bring paying dividends for years afterwards. Again, one must not expect great results all at once. I have known them in special cases, but usually when there was some other cause, such as tile drainage recently done. You cannot get a very large amount of the fertility in the soil in a single season by the most perfect tillage. It was not intended that man should be able to ruin land, work as hard as he may. But steady, persistent work will in time bring its reward. Tillage is not manure, in the sense that it adds any fertility to the amount in the soil. It simply makes more of the enormous quantity that exists within the reach of roots available. It is money, and that is what many of us want. I would not waste any fertility, but I would, and have, drawn on the vast quantity in my soil somewhat, to pay for my farm and improve it, and surround my family with comforts and luxuries, just as I had a perfect right to do, and as I would like to see many more do who need the money for so good a purpose. I started here on a run-down farm to compete with the rich, new, cheap farms of the great West, and I could not afford to put back all I took off. But do not suppose my farm is suffering, nor will it need to in a good many years, probably. When it shows need of food from the outside, we are in shape to give it to the soil now. Our wheat and clover are both too heavy this year. I wish you could see them. When I look over the tremendous growth, even, uniform and almost perfect, except for lodging, I say to myself: "See the rewards of thorough culture systematically followed up year after year!" Of course, tillage is not all, but it is what I am particularly writing about to-day. Draining, clover, manure-saving and many other points come in to help make the finished result, all of which I will touch on in time. During late years the writer gets much more backing than he used to in pushing this matter of tillage. In a late number of *The Rural New Yorker*, Prof. I. P. Roberts is quoted as saying: "We do not half estimate the value of culture. There are vast stores of fertility in our soils if we will only bring them out and render them available by thorough and persistent culture. * * * Good agriculture means, first, culture, and, second, careful conservation of farm manures plus commercial fertilizers." This is giving culture a pretty high place, but it deserves it, and no one knows practically any more about it than Prof. Roberts. Let me quote a little of his experience: "In 1876 we planted a field with mangolds and corn, following it with our regular rotation of oats, wheat and clover. In 1880 we again planted mangolds and corn, but enlarged the part devoted to mangolds, putting some on land before planted with corn. Now remember that mangolds receive much more cultivation than corn, the work continuing until quite late in the season. Then notice results. The crop of mangolds on part of field where mangolds were grown before was about 30 per cent. larger than that on that part where corn had been grown, and this, mind you, after an interval of four years, during which all the land had received precisely the same treatment. There is nothing like culture and plenty of it. We grew thirty-six bushels of wheat per acre the third continuous crop, without manure on land that had been previously well tilled." You see an older and wiser man than I puts the value of thorough culture fully as high as I do, and brings out strongly in this and other illustrations what I have just stated, viz: That not only will tillage show in the crop on which it is expended directly, and pay well, but also on the following ones for years. The results will be greater on some soils than others, of course. Now remember when you are cultivating your crops this season, that you are doing something more than keeping the weeds down and stirring the soil a little, and the more you study into and realize these matters we have been considering, the more interest you will take in advanced agriculture. You will become more and more master of the situation; less and less the slave of luck. In previous chapters you have learned how to avoid injury from excess of water, and now you see you can almost grow a crop without any directly from the clouds.

# CHAPTER XV.

## CLOVER AS A FERTILIZER.

I DO not propose to have any quarrel with any one about the order in which these subjects of drainage, tillage, clover and manure are treated. My friend, S. H. Ellis, once said of a controversy that the writer had in the papers over two of these subjects, that the only difference he could see between the other fellow and myself was that he declared it was manure and clover, and I wouldn't have it so at all, but fought for clover and manure. If you can give better attention to what I say in a different order, change it to suit yourself. It is the entire four-horse team that I wish to drive, and the order in which they are brought in is simply a natural one. Drainage lays the foundation for the best of tillage; but that is not enough alone. It will help us get more from the soil; but we want next clover to pump up from the subsoil, draw nitrogen from the air, increase fertility by shading surface, etc., etc. Then we have done our best so far. Next when we feed out any crops thus raised, we want to be equally thorough in saving all the manure we can to return to the land and still more increase the fertility.

Now let us suppose, to start this question, that I grew timothy in my rotation in the place of clover. Thousands of farmers do grow it, you know. Many sow a little clover on it, but the timothy, being well started in the fall, the clover does not amount to much. Practically, as far as getting any benefit from clover growing, as a means of increasing fertility is concerned, they might about as well have entirely clear timothy. If I got 2½ tons of timothy hay per acre, I would do well. This is a good, large yield. It is seldom that there is any second crop here worth cutting. In dry seasons there is absolutely none. In a wet, favorable year there may be a ton per acre (dry weight) of aftermath. The fertilizer in a ton of this timothy hay is worth, according to late tables that will be given in chapter on Manure, $5.48. Call the average of second crop half a ton per acre, one year with another, and the three tons of crop would contain $16.44 worth of fertilizer. Now, if I cut this and feed it out, as every one does timothy hay (that is, they do not plow it under), and save the manure as carefully as possible, my animals will take out about $2.44 worth of fertilizer. Thus, if the manure was returned to the field there would be about $14 worth of fertilizer from the timothy crop. I do not know just what the roots and stubble would contain. In experiments I have at hand this is not settled. I am of the opinion, from observation of the quantity, that an acre of the roots will not be worth more than half as much as the tops, or say $8, but I will call it $10, which is surely high. Then, when I plow an acre of this timothy sod for my potatoes, the roots and stubble, with the manure from the hay, will furnish $24 worth of fertilizer for the crop. Remember the amount. But now I do raise clear, heavy clover, and let us see how that shows up in this same line. We mow our wheat stubble once always, and usually twice in the fall, clover that would make at least 1½ tons of hay goes back to the soil as a fertilizer. Timothy will not make any such growth. I have had clover often that would have made two tons of hay per acre. The first crop the next year is cut for hay, and I am certain it averages more than 2½ tons. The second crop usually now goes back to the soil, and would make about two tons of hay per acre if cut. So we have a total growth of six tons, more or less. This is worth by the table, as a fertilizer, $8.20 a ton, or $49.20 for the six tons. I feed out 2½ tons, and deduct for loss from feeding the same per cent. as when feeding timothy, and we have $46 left at least. The roots and stubble of a crop of clover are equal in value, as a rule, to the top growth. That is, when I cut the first crop of 2½ tons per acre, which crop is worth $20.50, the root growth and stubble at the time is worth about the same. It increases decidedly while the second growth is being made, and it cannot be far from right to estimate the entire growth for season, with the stubble, at three tons per acre. I think this too low, but clover shows up well enough without one's being in the least unfair in comparing it with timothy. The three tons are worth (same as tops per ton) $24.60. Add to the tops and we have an acre of my clover furnishing $70.60 worth of fertilizer—$70.60 for clover against $24 for timothy. And, to the best of my knowledge, this is not far from right; at any rate, there is no intentional mis-showing on either side. Now the question comes up at once, where does the clover get this surplus fertility? This excess over what the timothy has? This is the vital point. If it gets it from the soil only, the same as the timothy does, why then, although it may help us for the time being—help us to skin the soil—it is not such a great friend after all. The real value of clover largely hinges on this point. We know that timothy feeds in the soil directly, and it doesn't send its roots very deep either. How does clover get its store of fertility?

First, it draws on the subsoil largely. Its roots run deep on drained land. This is its nature. The rains are constantly carrying fertility down, and clover goes down and brings it back. The subsoil itself usually contains much plant food naturally, and clover can get more or less of this that timothy cannot, and pumps it up near the surface. Notice the root growth, how admirably adapted to serve this important end. The large tap root goes down about as far as ordinary crops send their feeding roots, and then the smaller roots and fibrous ones go on down, down, and hunt and search for food, storing it in the large root in the surface soil and in the top. When these are plowed under you have the fertility brought up where corn, potatoes and wheat can get it. Few know how far down clover will send its feeders. Do not think the readily visible tap root is all. When digging the drain, told about in second chapter on drainage, where we drained a hollow into a gravel bank without any outlet, we dug part of the way 10 feet deep. It was in a clover lot. There was nothing else growing but clear clover. It was just before we were to plow it under for potatoes, so it had made its full growth. When we had the ditch open I got water and sprinkled the sides, and found the little white feeding roots of the clover down to a depth of eight feet. I could readily see and trace them when wet. This was on a porous subsoil—a gravelly loam. The subsoil was not much harder to dig at this point than the soil. A little ways further we struck the heavier soil, which is found in most of the field, except right on the hilltops. Here we traced the clover down to about four feet in hard pan that we had to pick. We could not force a spade into it at four feet deep, or at three. I do not know how these delicate little fibrous roots could work themselves into such hard ground, but they were there. It was simply wonderful to me.

Second, it is now a settled fact that clover draws some nitrogen from the air. For many years this has been a disputed point. Men of close observation have felt that it must be so, but scientific men were unable to prove the fact, and so we clover men, although certain in our own minds, could not say very much about this. I remember riding across Wisconsin one day with my venerable old friend, J. M. Smith, a number of years ago. We were talking on this point. Some of you may know that the writer has done all he could in years past to get farmers to realize what clover would do for them. If I hinted in the papers that clover got any nitrogen from the air, why some writers would quote high authorities to me and sit down on me pretty solidly. Of course, these were men with just a smattering of book learning that they wanted to air. Your real scientist is precious careful what he says. He realizes that we know in part. No one ever heard Dr. Lawes say clover does not get any nitrogen from the air, but rather that we haven't yet been able to find that it does. Well, friend Smith knew how I was working for clover, and from practical experience. I well remember his closing up with: "Well, Mr. Terry, I cannot but believe that clover has the power of using the free nitrogen of the air. I cannot fully account for the great results that have come from its use in many instances that have come under my notice during my long life in any other way." Well at last we are backed by science. That is, science has proven what the practical farmer long since knew must be the fact. It was on this trip to Wisconsin that Prof. Henry said to me, "I believe you are right (speaking from his experience as a farmer), but I cannot prove it." Well it is proved now. It did not come through the leaves as they were looking for, but through the roots, but from the free nitrogen of the air, all the same. We can hardly say just how much nitrogen comes in this way; in fact, doubtless, the amount varies, under different conditions considerably. We cannot say whether this point is as important, or more so, than the first one considered—the pumping-up power of clover. They are both important. I do not attempt to consider these points in the order of their importance at all. Third, clover increases the fertility of the soil by shading it almost constantly during the season of its growth. In figuring up the greater amount of fertility that clover could store up, I did not put this in. It is extra over and above the $70.60. I did not know how much to put in. We haven't got far enough along to tell yet, but that this is an important point I am certain. Probably it comes close up to the two just passed over. This is the rule: Covered land, shaded land, grows richer, and bare land grows poorer. This is Nature's law. You cannot place a single straw on the surface of the soil without thereby increasing the fertility. True, it is precious little, but that little is in the right direction. You cannot lay a board down in your garden and leave it during hot weather without increasing the fertility of the soil under it. I do not say it adds anything to the soil that did not exist before in some form, that it creates anything, but that it makes that soil more fertile; there is more available fertility there than there is in the soil on each side. In some way the processes of nature for making plant food available have gone forward faster under that shade; the conditions were nearer right for it. I do not think enough credit has been given to this point in figuring up the benefits of clover growing. Timothy, wheat, corn, oats, do not shade the land like a heavy crop of clover. There is partial shade, but not the heavy mulch that clover affords, that daylight can hardly get through, that scarcely dries out in midday in the warmest weather. And if one manages rightly he can have these conditions, the most favorable known for increasing available fertility, nearly all the time from the day his wheat is removed (if clover is sown with wheat) until he turns the clover under to put out a money crop. Is it not correctly named—a renovating crop? Is timothy a renovating crop? No. A change may be a rest to the land. The timothy sod has considerable value to turn under, but it is not a renovating crop by any means. It draws from the soil and does not shade the land or in any way work much different from what our regular money crops do, such as wheat, corn, oats, etc. *The Rural New Yorker* expressed this very tersely and neatly in a single line lately: "Clover collects nitrogen; timothy eats it."

It is entirely certain now that clover does not draw on the soil only for its fertility, and hence it is not like drawing on a bank where you can only check out what you have first deposited. It is not like taking money out of one pocket and putting it in the other, which does not make you any richer, only in part. You can get some fertility free from the air. If your land is drained naturally, or with tiles, you can draw on another farm down below yours, by means of clover. If you had rather it would lie there idle, waiting for a more progressive man to pump up thousand of dollars, like coal in a mine or oil in the bowels of the earth, all right.

Of course, clover grows in the soil and draws on it partly while adding to the available fertility. It perhaps can get a little more out of the soil itself than other plants, is a grosser feeder. You cannot eat grass, but the steer can, and you can eat the steer then, and so get the grass. Just so clover may get some fertility from the soil itself that wheat and other crops could not, and then being turned under, this food becomes available to the other crops, food which they could not use before clover did its work.

But now let us look at what becomes of that $70.60 worth, more or less, of fertility that clover gives me per acre. You may cut it down $10 or $20, and still it is a big thing, if you feel that my figures are too high. They certainly would be too high for a common crop; but I think not for mine as treated. I sell in three years a crop of potatoes and a crop of wheat off my land. The clover and straw from wheat are never sold. The average crop of potatoes is nearly six tons, say, per acre, and of wheat one ton. The potatoes contain $12.24 worth of fertilizer; the wheat, $7.09. Thus all I sell off of an acre in three years is $19.33 worth of fertilizer. With more than three times this amount furnished by the clover, is it any wonder fertilizers fail to show any result whatever? Of this I will speak more fully under the head of Manures. The question was asked Prof. Thorne last winter at an institute, What becomes of the rest of that fertility that clover furnishes? He replied: "It takes some to grow the vines, of course, of his potatoes, and the straw of wheat, and then a crop cannot use all of any food furnished. When we use commercial fertilizers, the crop cannot make use of near all, no matter how soluble they may be. The rest is changed into insoluble (for the time being) compounds, and is stored up. I believe Mr. Terry is storing up fertility in his soil. If he should stop growing clover he could draw on this somewhat until it became exhausted."

We have now gone over the subject quite fully, giving the reasons why clover increases the fertility of our soils. According to the latest teachings of science, what has been said is about correct. Several times last winter I was honored by the presence in the audience at institutes of high scientific authorities—such men as Professors Hunt, Thorne, Weber, Latta, Lord, etc.—and several times I asked them to tell me, afterwards privately, if I was at all out of the way in any statement made in regard to clover. But this is the scientific side. Does practice show results that correspond? Can one feed his crops so much better by growing clover as these figures would indicate? On my farm, yes. In this case I see no reason so far, why practice and theory do not go hand in hand. Actual results first led me to paying more attention to clover growing. Twenty-five years ago I believed that growing clover was simply taking out of one pocket and putting it in the other; that the soil gained nothing, because all you got was taken from the soil. My faith was all tied, and blindly, to manure making; stable manure was my hobby. Well, it was a good one, but so was clover, as I gradually found out. It is curious to look back and think how gradually I worked over to thinking more and more of clover. I read about it, of course, then, but what I read had little influence. I thought I knew what was best. But the very first spring after I came here I sowed a small piece of clover, without any manure on it, on land that the tenant would not plow the year before for all the crop. A fairly good stand was obtained, and the two crops cut the next season against one on the rest of same field, which was in timothy, attracted my attention somewhat. When I came to plow the field the clover land yielded well without manure. I think I explained to you in a previous chapter how, in changing around the divisions of the farm, it so happened that parts of fields had been heavily manured and parts not. Of course, where this heavy coating of manure was put we got good crops every time. It was good plant food if one could only get enough of it. And I used to put on enough—about 40 good, solid loads per acre. It would have been wiser to have spread it lightly over more acres and on young clover to make that grow strong, but we did not know then. A big dose on a little ground was what we put on. Of course, it was little land, because we could not cover much so heavily. And we kept putting on to the same few acres, too. I well remember overhearing a remark made by a man, who was riding by once, to his mate, when looking at the quantity of manure I had spread on a little land for sowed corn, viz: "Terry had better sell his manure and buy his corn." Well, there was reason in it, and it set me to thinking. Now, one field was manured at one end thoroughly after this fashion for some time, while the other end was not, simply because at first we hadn't the manure to put on. All was clovered in regular rotation afterwards in one field, and time and again I have taken friends to the line, and asked them if they could see any difference in the growing crop between the part of field that had been so heavily manured and the part that had had but little besides what clover had done for it. I well remember taking my friend John Gould to see this some years ago. I have not been able to see or find any difference in the yield for a good many years past. Little by little the value of clover as a renovating crop was forced upon me, and I began to treat it better and think more of it, as the better treatment brought still better returns. Could I have known as much as I do now at the first, and used my manure to grow clover over a large area and treated it as well as I now do, I might have got out of debt much sooner. By looking over some of my old writings I find this, written ten years ago, "A good clover and timothy sod on our land will raise a large, paying crop of wheat, without any manure, with proper and thorough cultivation." I did not know then that a clover sod could furnish fertility for a potato and wheat crop. I had too much timothy in my clover for best results.

I state here, positively, that the heavy manuring done first has not made any material difference in my success with clover. I did *not* make my farm rich with manure first (only a small part of it), as has been stated by those who only knew in a general way that I made lots of manure, as I did. By far the greater part of the fertility used has come from clover growing. I have in mind one farm of precisely similar soil and well farmed, on which a dairy is kept, and has been all these years that I have farmed without stock. But little clover has been grown. Some is sown with timothy, but until quite lately not in a way to do much good. There has not been one single year since I began raising wheat that this farm has equaled mine in yield per acre, and more than once I have beaten it two to one. I do not say this to boast, but to teach a lesson. He may come onto my farm with his dairy and timothy and I will go onto his with clover and what manure I make and in six years I will beat him again. You may believe this or not, I do, and I must preach what I fully believe.

As lately told of in *The Practical Farmer*, in 1889 a certain field of ours had on a fine stand of young clover. After the wheat was removed the clover was clipped back to thicken it, as usual. Late in the fall we covered half an acre of this with a heavy coat of good manure, at the rate of some forty loads per acre. It was spread as evenly as possible, and after the rains had worked what they could into the soil during the fall and spring, it was plowed under. The land is too level to wash, and is a strong clay loam and not leachy. On this half acre we set strawberry plants in the spring of 1890. Of course, they were thoroughly cared for and mulched in the fall, but the great frost of May 16, 1891, destroyed a large part of them. This half acre was plowed along in July, and the manure thus brought to surface again and most thoroughly worked, often, till seeding time. The rest of the field of similar soil grew clover in 1890, a heavy crop. The first crop was removed and seed taken out of second and haulm returned and spread. It was plowed in spring of 1891 for potatoes, no manure or fertilizer being used. A large crop was taken off and then the entire field, half acre and all, was put in wheat, the same day, and the same kind of wheat. The half acre was rather the best land, such as we always select for strawberries. The wheat to-day is certainly not one bit better on the half acre than on the land adjoining. It started better last fall and this spring, but the clover-fed wheat came on grandly and steadily until it is every bit as good. I will not say better, but visitors have so said. If I can feed wheat with clover only, and take off $100 worth of potatoes per acre and then grow as good wheat as on land fed with forty loads of manure per acre, thoroughly mixed and rotted, and no crop taken off, do you blame me for thinking clover, as I use it, is of wonderful value to me? Well, this is not theory, but just what I have done.

It is just what I can do again. It is just what many of you can do; but not all at once, by any means. One great trouble with us is, we want to get immediate returns. Sometimes we may, but generally it will take years and years of persistent, thorough work in drainage, culture, manure saving, clover growing, etc., before we get our full reward.

Since writing the above I have been away on the cars. As we passed by fields that were producing almost nothing, poor, apparently, clayey, flat, water-soaked much of the year, and like brick the rest, I fell to wondering what could be done to improve them, whether any clover would do much good, etc. How I would like to try a field of that kind with tiles first and then tillage, pulverization and clover, with a light top dressing of manure put on with spreader to insure a good stand! I would like to see what I could do in eight or ten years' time. I should not expect such results as on my best land. I should never attempt to grow potatoes; but I do believe that I could in time, with only manure enough to start clover, if needed, grow 25 to 30 bushels of wheat per acre, and large timothy and clover, 2 to 2½ tons per acre. I have done it on small spots of as poor (?) clay soil and on acres that were but little better naturally, except not so flat. But good drains would make the flat land all right.

There are other crops that can be used for fertilizing. Years ago, whenever I had any stubble that would otherwise be bare during winter, I sowed rye on it thickly, two to three bushels per acre, and let it grow during the late fall, winter and early spring. You can see plainly that what fertility that rye could pick up would have leached down considerably, at least, and gone to waste, if not used. It is not wise to have land idle long. Of course, I would sow wheat if in time; but rye can be put in later, any time before winter, and do some good. A good, thick, heavy rye sod to plow under in May is worth something. Its chief value, though, comes from its saving fertility. It thrives on what is in the soil. It does not draw from above and below, like clover. But it does this work without using the land only when it would otherwise be idle. I have had rye two feet high to plow under early in May. I would sow it if no more than a good sod was made to plow under. Once I read in the papers what nice hay one could make of rye cut in bloom. I tried this. Cut it, I think, the 20th of May. It was six feet, or more, high. Bound it, and set up to cure. I never had such a pill on my hands before or since in the shape of hay. I couldn't starve my animals into eating it, and finally sold some to people to tie up corn fodder with and the last few loads to horsemen for bedding. I have cut and fed it green to cows. When quite young and tender it went well, with grain, but soon gets tough. The best use of it with me, decidedly, has been to occupy the land when idle, and then plow under. If on dry, sandy land, so the tramping will not injure the soil, I am told that a field of rye makes excellent early pasture for light stock. I can believe this; but a potato man would likely get better returns to feed it all to his potatoes, particularly if the season following was dry.

I use the common clover entirely. We want the first crop for hay, and this makes better hay than the Mammoth. And then we can grow a large crop after the hay crop to plow under.

# CHAPTER XVI.

## TREATMENT OF CLOVER.

YOU have had a whole chapter on the fertilizing value of clover, and it was broadly hinted that we gave it the best of care, just as we would any other crop. Let me tell you just how we treat it now to get the most money out of it on our farm. The matter of seeding will be more fully discussed in another chapter. Briefly here I will say we sow clover seed alone, now, on our winter wheat, and have always sown it very early. We have never had a failure to "catch" in twenty-three years. We got good results from clover and timothy, but for our farm we can get better from clover alone. This is for fertilizing our land all we can for wheat and potatoes, hay being a secondary matter. It certainly is true on most of our land. I am inclined to think a little timothy might be better with the clover on some of the very heaviest clay. When we come to cut the wheat, then our care of the clover begins. It is not left to grow if it can, or as it happens to be, but is systematically tended to the same as a crop of potatoes would be. It is not the money crop, but it is the feeder of it, and hence equally important. When I ride the binder I am looking at the clover all over the field. The same when drawing in the wheat, as I may have time. Some of the clover will look weak and feeble, some years, at that time, as though it was almost a question whether or not it could pull through. Some may be strong and rank. One must decide the cause in each case, and act accordingly. If the wheat is very heavy and thick, good for forty bushels per acre, and the clover is small, I know why. It has been almost smothered. But it only needs letting alone, and it will soon come up on such land, wet or dry, hot or cold. If it is small and feeble where wheat is badly lodged, it will also generally take care of itself after the wheat is removed. Where very heavy wheat gets down early there will be small spots smothered out, sometimes, but I have never had enough to make serious trouble. The land is so rich in such spots that even if the clover seems all killed it does come on afterwards. Seeds that hadn't grown before, perhaps, now come, and if there are only a few plants they will stool out like everything. I have never but once sowed any seed again in such places. They come without. But now, if there is a spot where wheat is thin, will yield, say, twenty bushels per acre, and clover is rather feeble, too, that clover wants feeding moderately. If I had thin wheat on my best land the clover would be very large, so I could hardly run the binder high enough to not get it in the butts of the bundles. I usually find some thin wheat with very feeble clover in it, so small you can scarcely see it. This wants a double dose of fine manure at once, before a shower comes, if possible. Don't think I get a heavy, rank growth of clover all over the field, uniform and almost perfect, sometimes entirely so, without attention. I have to work for it on my soil. I have had farmers go over my stubble right after harvest with me, and say, "Well, I don't call that a very good stand of clover," and still before winter I would have the field from end to end a perfect lawn of thick, dark-green clover.

The first operation is to take the manure from our covered yard and put it just where it will do the most good. Such manure as we have it would only be practicable to do this with a spreader. To do such fine hand work as to not smother young clover, and to have the manure fine enough to do the most good, would be a tedious job. We sometimes do spread by hand on very small spots. Thus used, the manure helps to bring the clover all up to a uniform standard. If we can make a large growth of clover come on a poor spot, large or small, why, we know we are getting plant food then for following crops. The clover will not let any manure go to waste, but will store it all up practically and more with it. If the manure makes the clover grow larger, gives it a start, why it reaches down further and brings more up from below and more from the air. "Unto him that hath shall be given." I believe I can use my manure to better advantage in growing clover, in feeding the renovating crop, than in any other way. It gets to the potatoes and wheat in the end in the best possible shape, and an increased amount of it, and it is not put on parts of field where it is not needed. But, of course, you understand this manure must be finely spread, or it will smother some young plants. I have seen it stated that manure could not be spread on clover without injury to it. Well, I know it can, for I have done it. It should be so fine that after a shower and a week's time, hardly a trace of it can be seen in sight as you pass by the field. I can manage the spreader so it will mostly be thus spread, but we always go over the field after it with a fork to shake up any bunches that may be left.

Now this is the best time in the whole season for me to get out manure. The ground is usually hard, so no injury will be done. Really, I have seen farmers draw out manure in the spring on soft ground when I thought they did the land nearly as much injury as the manure would do it good. This is not mere talk; I fully believe it. I do not want my land tramped in the spring. On some sandy soil it might not matter. Then in the spring we are busy. It might be drawn early in March, before busy time begins, while ground was still frozen, by selecting days, but then there is danger of waste by washing on my farm. I have tried it. After we get our wheat in the barn we have the time. It is warm weather, but the loading is done out of the sun and in the wind, and the horses do the spreading. But some one may say, Will there not be waste, spreading manure right in midsummer to dry up? Yes, waste of water, but practically nothing else. You can evaporate water out of the manure, but it cannot take the potash with it any more than it can when it evaporates out of your soil, or out of the potash kettle, where the lye is boiled down. You can no more evaporate phosphoric acid than you can maple sugar when you boil down the sap. But how about the nitrogen? Well, you need not worry about the loss of nitrogen by evaporation, when this valuable ingredient is in the form of nitrogen. When it has changed into the more volatile form of ammonia, it would escape if spread on the surface of the ground in hot weather, certainly. If you should take manure out from a large pile where it was heating considerably, and nitrogen had thus become changed to ammonia, you would waste this ammonia by spreading. But there are several points to take into account. Very likely you would waste less than if you left the pile to go on heating, for this gas will pass off from the pile into the air, unless there is water or land plaster or earth or somesomething to absorb it and hold it. When spread thinly, heating and further formation of ammonia practically ceases. Again, a little ammonia makes a great smell. It is strong. In drawing out from a hot pile you would not waste a great deal. But we do not draw out from a pile, and do not waste practically any. Our manure is kept from heating by spreading, moistening if needed, and packing, and land plaster is used. I have never been able to detect any ammonia escaping from it. There is precious little there. "But how can you rot your manure and not have it heat more?" We do not want to rot it, but to keep it as fresh and dormant as possible until the best time for us to use it. I would put it all, fresh from the stable, on the young clover, if I could have it all fresh just when I want it. I do not expect it to gain anything by keeping, and it is a hard matter to prevent loss. I would not have it rotted if I could without loss. I think I can do better. Having shown you that there is no loss from spreading on surface in clover field by evaporation, let me go a step further and say I believe there is a decided gain. In the previous chapter we talked over the mulching value of clover.. Now can you not see that coarse manure, spread on the surface, to lie there and decay, will help shade the surface, the same as the clover does? If it does, it helps increase fertility. The rains will carry the valuable parts of manure down, and clover roots will take good care of them; meanwhile the refuse is shading the surface and helping some, helping the young clover to get started, for mulching between young plants that are feeble helps greatly, shading the ground until the clover can get started. "Rake up in the hay the next season?" Not a bit; all gone into a sort of mould on the surface before then.

Now we have fed the feeble clover—what next? When the best clover gets, say, a foot high, or a little less, I mow the field all over, taking off track clearers so as not to bunch clover at all. If I do make a bunch I get off and spread it. I want it to fall evenly, and there I let it lie and shrink up. More mulch. Of course, the wheat stubble is cut off and falls down. More mulch. If there are any weeds, they are prevented from going to seed and go to make more mulch and more fertility. The knife of mover is run as high as we can set it. I do not want to cut off the feeble plants that are just starting on poor spots much. I do not want to cut any close. I want to keep some for shade. A little clipping of the top thickens top and root growth. Where the clover is heaviest there will be quite a mulch from the tops and stubble; where it is light the manure helps make up. Result, fairly mulched all over. When best clover gets near a foot high, again repeat the mowing. Once in a while the season is so dry one mowing is enough. The last mowing should not be later than middle of September, here in Northern Ohio, as the clover after that will only have sufficient time to make proper growth for winter protection. I would not do either mowing in a dry, hot time, unless necessary to destroy weeds before they went to seed. Wait until a rain, either just before or after it. Just before might sometimes be risky, unless you are a good judge of the weather.

Now my field goes into winter in the best condition known to-day for increasing fertility and catching the rainfall and making it soak down to get more fertility. There will be no trash in the hay the next year, either. Cutting clover, weeds, etc., when tender, before they become woody, they shrink up and decay, and then the heavy growth of clover helps rot them by shading and keeping moist. The mice will not trouble, either. They will often injure clover left standing, or lightly pastured. I have known them to almost ruin a piece. They are plenty about here in pastures and fence corners, but they have never done me any harm where clover was thus treated. They will not venture into so clean a field. The mowed stuff all sinks down close to ground. There is nothing standing to hide them. I speak from long experience in this practice. Do just as I have stated and all will be well. Mow once and late and close and the woody trash will not rot and cutting clover so late it will not throw up enough growth after to protect itself, and may freeze out much worse than though not touched.

Notice, no stock are ever pastured on my clover field. I could not get such results from pasturing. I could not get the uniform stand and great root growth. Many pasture young clover in the fall. On my farm, for my crops, every dollar that I got in this way would safely cut me out of $10 in the future, and, perhaps, much more. I cannot afford to have my plants injured. They are too valuable workers in pumping fertility up and down and shading surface. And then my soil is mostly too heavy to be tramped by pasturing stock, if at all damp. We must have air in the soil, or the roots cannot get the nitrogen from it. We must not tramp and pack soil in a clover field, or cultivated land, ever, only what is necessary, if it is as heavy as mine, if we are after best results in crop growing. I have pastured young clover in the fall. Yes, I have done just such a foolish thing; but it was long ago, and I paid dearly for it. Soon learned better. But it took me longer to learn that I could not afford to ever pasture land at all that I crop, not even the second growth the fall before field was to be plowed. It won't do. Land must not be packed, and surface must be kept mulched. No animal ever steps foot into my cultivated 35 acres, except for purposes of tillage or drawing crops off or manure on. I wish sometimes I could do this with a balloon. And yet sometimes packing is beneficial, as we will speak of in chapter on Wheat Culture. We usually cut the first crop for hay. We need just about that much. And we need the manure from it and the wheat straw to spread on thin spots in the next year's young clover. We try to mow it early, when in full bloom, because it makes the best hay then and gives best chance for a large second growth. Cut a little later it would cure easier, but I can plainly see when feeding out that it is not as valuable for feed. I have tried most all ways of managing second crop. It has been cut and fed out, cut for seed, and haulm returned, and allowed to go back to soil uncut, and the latter seems to me the wisest on my farm, as a rule. But, remember, I grow potatoes. I expect to get about $100 an acre for them, and often more. I may easily sacrifice $10 or $15 worth of seed per acre, or hay, to such a crop, for almost certain better results, when it would be quite unwise to do this for corn or wheat, which bring so much less per acre. The little vegetable matter turned under on every square foot that comes from the second crop clover is very helpful to the potato crop nearly always. The manure from same could not be spread over all the ground and would not do the same good. Neither can one do this with the haulm from seed. But I would cut for seed and plow under haulm, rather than cut for hay and feed out and use manure. I suppose I plowed under 30 bushels of clover seed this spring. I might have cut it if I had known how high it would go, but at $5 a bushel I would not, certainly. And still there may be exceptions. If I were in debt, and greatly in need of funds, I might have to take the bird in the hand. With money to invest, I can do the way that promises best returns in the end.

But, now, when shall this second crop be plowed under? When the ground is dry enough to work safely in the spring, and not before, on my farm. More mulching, you see. Keep the land covered until the last moment. Don't let it lie bare all winter as the result of fall plowing. Keep live roots in the soil to gather up any stray fertility that would otherwise go to waste. This is best here, with our open winters. In Maine or Wisconsin it may be a very different matter. There, winter locks up and stays. Here it may be open half or more of the time, with great rainfall. My clover goes into the winter, the second year, with the ground mulched even more than the first. And this mulching is systematically done, even that is not left to run itself. Man can generally help nature to advantage. The clover would fall every which way, perhaps, if left to itself. So when it gets about knee-high, and just before it goes down, we harrow it down with smoothing harrow the same way we want to plow in the spring. Thus the clover lies away from the plow, and with a jointer on there is little trouble in turning under a heavy crop. And it is harrowed down evenly all over field. Every square foot gets its share. If it fell down it might fall so as to give spots a double dose and others very little. Our second crop usually would make two tons of hay per acre, so there is quite a quantity to turn under. It delays plowing a little in the spring. This I dislike, but see no way to help it. The land is longer drying out when so much shaded.

The midge has troubled us some here. He lives in the heads and sucks the life out of the seeds as they are forming. Not wanting the clover from one field for hay one year, I managed so as to get a good crop of seed in spite of midge. There are two broods, one coming when clover blooms naturally the first time and the other get around for second crop bloom. I don't think they have any daily papers to inform them, but nature teaches them when clover will be ready for them. I mowed off my clover about middle of May, say, when ten inches high, and let it lie. This brought a second crop in bloom at an unusual time, earlier, and the result was a mass of full bloom, the real, old-fashioned kind, and a good crop of seed.

The clover root beetle has troubled us some—a little beetle that you can see with the naked eye, if you look closely, that eats the roots until they are all but destroyed sometimes. They have not hurt clover the year of seeding and not until the second crop was well along the next year. If the clover were to stand another year they would do great damage. It would not amount to much with the tap roots all eaten out. But clover should *not* stand another year. After two full years' growth it has done its best for one, and should then be turned under, and the fertility it has gathered up turned into money. A very common practice is to sow timothy with it and let the clover run out, and then the timothy eats up the accumulated fertility, and is taken off, and then, perhaps, when the clover is all run out the sod is plowed, and the farmer says: "I don't see any gain in fertility from clover growing. I believe that Terry is a confounded liar!"

This year we have a new pest in the shape of the clover leaf weevil. It ate holes in the leaves early in the season in a sad manner. But there is a big growth now all the same.

In regard to saving seed, I prefer to stack the seed clover in the field and thresh there. It is fearful stuff to hull in a barn, or mow away, either. I have tried it all I want to. It is easily saved in the field. If one could get a huller and have good weather at just the right time, he might hull right from the field and save handling. But it is risky waiting. A long wet spell may ruin your seed. I build a stack, as of hay, laying out as I go up until I get as high as one can handily pitch, and then round up slightly and let stand till next day, if weather is safe, or longer. I put about 8 or 10 loads in a stack in this way. I build them in the four corners of a square, if I have four, just far enough apart so we can set huller in between two. After hulling two, move forward to next two. No matter which way wind blows, you can set huller so it will be a comparatively comfortable job to do the hulling in this way. After stacks are settled, I cover with straw. I go to barn, and, as the straw is pitched down onto wagon rack, I sprinkle every course, putting on, say, three gallons of water on each one. It is better that the load should stand over night, but not necessary. With this damp straw we top out the stacks, laying a course around outside as far down as possible and whipping down, and then another over and above it, and so on. A moderate load will cover two stacks. I should think 500 pounds of dry straw would cover a stack. When stack settles over, the straw lops way down nearly to ground, and sheds water entirely. I have built many stacks, and never had one wet in. Of course, the straw must be fastened on well. I run two bindertwine strings over and tie a stick of wood on ends. If the haulm is spread directly back on field, one needs to spread thinly, or it will keep frost in in the spring wonderfully. I got badly bothered in this way the first year.

I would not plow clover under until spring for corn any more than potatoes. You may wonder whether the clover, dying on the surface, does not lose something; whether it is just as well as turning it under green in the fall. It does not lose any more than manure spread on surface. The water dries out. It may not decay quite as quickly as if turned under green, but you lose no fertilizer practically.

A word as to the feeding value of this wonderful renovating plant. First, by mowing twice I used to get four or five tons of hay per acre. I have mowed three times. This is twice as much nearly as one could have got of timothy on my soil. How that helped me at first! I do not know whether I have told you before, but I actually did get once about $100 an acre from some fine clover on my best land, fed out in my barn, when hay and beef were both high. Next, it is worth more than timothy, if cut in bloom and well cured. It has nearly double the albuminoids, (flesh-forming substance), a little more fat, but not quite as much of the carbohydrates. But, of course, you know the former substance is the most valuable. It is what we get so largely in linseed meal and cottonseed meal. As compared with oats, clover hay has fully as much of the albuminoids, pound for pound, but not quite as much of the fats, and is quite a little behind in carbohydrates. Theoretically, good clover hay is about a perfect food for cattle and horses. It comes nearer to this than any other single article that is fed. But I am speaking of early cut clover —dried grass—not that that has stood too long. The practical farmer agrees well with the chemist in regard to the value of good clover hay, at least some of them do. When I first began farming, it seemed to me that if clover contained as much of the flesh-forming substance as oats, ton for ton, that, as I could raise five times as many pounds of clover hay per acre by cutting twice as I could of oats, I had better drop oats as a crop, and I did. And this is not only true, practically, but the clover tends to increase fertility, while oats would not. To bring in an oat crop I should have to increase my rotation to a four-year one instead of three, bringing in the renovating influence of clover less often. Rather than do this on my farm, as a matter of money making, I had better buy oats, by all means, if they are needed. I might raise them, of course, whether it paid or not. But I do not think they would ever stand up to be cut on my clover-fed land. Clover has been with us for some ten years a by-product. We must grow it to furnish fertility. We need not plow it all under. If we can keep our horses on it, instead of on timothy and grain, we are ahead. The nutrition is in the clover. It is only a question of whether we can get it out practically. We have done so. During the last ten years, I presume, the feeding of clover to our horses, instead of timothy and grain, has saved us in the grain bill $1,000 or more. This may seem large to some, but we never have less than four horses and often more; $100 worth of oats a year would not be as heavy feeding as some neighbors give. As it is, I have not fed $100 worth of grain in twenty years. Ten years ago last fall, I bought a fine team of work horses, weighing about 2500. They were six years old, and had been used to a heavy feed of grain three times a day. I gradually worked them off of grain onto clover only. I took care of them myself then, entirely, and drove them myself. I had a desire to show people what I could do with clover. Before that I had not had a fair chance. My horses were inferior, and old, and grain would not have made them much different. Well, when I bought this good team, as fine as walked in these parts, fitted up to sell, people said, fat and sleek, one good old neighbor said to the one who sold them to me, "Doesn't your conscience trouble you, selling that team to Terry to starve. He will let them run right down." Instead, people soon began to say, "What under the sun does Terry feed those horses on to make them gain so. Why just look at them!" Yes, they gained on the scales 320 pounds within a few months, and it taxed my strength and skill to the utmost to handle them. Every one turned around and looked after I got by. That good old neighbor looked a little sour when I would ask him if he thought they had run down any yet. In those days I was drawing produce to Akron, twelve miles, almost daily, for months, with these horses, and I kept them right up in high condition. They were never driven off from a walk, but they got around as quickly as those who trotted. They have walked to Akron with a heavy load in three hours and thirty-five minutes, and back in three hours always, within ten minutes. About this time there was a good deal of excitement over the matter. Probably no one believed that they received no grain of any kind. Visitors, when they thought I was not looking, examined every corner of my barn, looking for grain. I fed none and had none. At last I offered a reward of $500, I think it was, in the paper, to anyone who would prove that they had anything but clover hay, salt and water. For ten years they have done my work and are strong and healthy, and have never, I think, weighed less than when I bought them, although they are getting old now, and, perhaps, hardly keep up. I have often driven one twenty-five miles in half a day on the road; but they are too heavy for such driving. We have now a lighter team for driving that we feed some oats to, four quarts each a day now, and the balance clover hay. I endured a good deal to carry my point and show what could be done with clover. Some ladies wrote me as though they thought I was abusing the horses. One friend in the papers imagined them as resembling whey-fed calves. At one institute, I well remember the audience were going for me unmercifully—thought I was lying. The speaker with me, had ridden behind the horses, and knew just what high condition they were in, and said to me when looking at them: "Terry, you never can afford to keep such a fine team." But he was utterly mum before this doubting audience, leaving the impression that even a neighbor would not back me. And still I used to hate to drive into Akron, so many wanted to buy that team, when the clover had got them in such high condition. I refused $500 for them, although I paid but $380 the fall before. I meant to carry my experiment through. Hundreds of visitors during these ten years, from every part of the country, have seen the horses, and I hope some have been helped to see the feeding value of clover.

The nutriment is in the clover hay, it is only a matter of having the animal able to eat enough to get it. This would not do for a slim road horse. Ours were chunked-built work horses, and as they were fed and driven were all right. I am not advising the practice, but this is what I have done, and should do again if in debt and wishing to make money. One thing is noticeable, we have never had a sick horse in all these years. Neighbors have lost quite a number of grain fed ones. One reason why I will not recommend the practice, is that many would not have such hay, and leaving off the grain the horse would soon run down. And again, our farm is small and continuous hard work does not last often, more than two or three weeks at a time. Many let grass or clover stand until it is past its best, and then feed grain with it to make it as good as clover alone, cut in time. I could *not* have done what I did with timothy hay or timothy with a little clover in it. The horses could not have readily eaten enough to get sufficient of the flesh-forming substance. I have spoken of mowing two or three times for hay. Nearly always the second crop cut in time makes as good hay as first. Once in a while it would make horses slobber some. But last year the first crop did the same. They got used to it after a while, so it did not trouble them much. When the weather is favorable my plan for curing is about as follows: Mow in the afternoon, as the weather is clearing after a shower. Let lie next day until so dry leaves begin to break off, then rake into large wind rows. Turn these over with fork next day after top is well dried and about noon begin drawing in. With settled weather I can make good hay this way at little expense. Of course, I have plenty of help at work in potato field, and if rain threatens we cock up or do best we can. Once in a while in a catching season, we have to cut and cock up soon as wilted, but I try to avoid this, as it is costly work. I have cocked up hundreds of loads, and years ago bought hay caps to cover the cocks. But they have not been used in eight years, I think. It is too much work. If desiring to cover, I would make caps out of heavy cotton cloth, six feet square, and put hay up in large cocks and high, some 150 or 200 pounds in each one. Strings with a loop in should be tied to corners of caps and pins made of strips of shingles 1½ inches wide, used to stick through loops into bottom of cock to hold caps down tightly. Thus put on they will stand a storm that will blow down rail fences and spread ordinary cocks all over the field. Clover hay should be drawn in always in the hottest part of day, say from 11 A. M. to 5 P. M. It should be free from dew and rain entirely, and warm all through, and then if put in a tight barn it will do quite green. Shut barn up tightly as soon as it is all in. The steam rising from it should not meet cold night air, or it will condense more, and settle back into mow and injure hay. Dew begins to fall sooner at night than some think—as soon as the temperature begins to fall much. Clover in the field will catch it readily, and will not make as good hay if drawn in a little damp even. It is only by experience that one can make good clover hay, and not always then in some seasons. Still in all these years I have never had any that was not passable. One year we had a large field out in the cock through two weeks of rain, but when the sun came out warm again we got it up in fairly good shape. We turned the cocks between showers; that is, built them over, putting top on the bottom and so on, thus airing them some. But it is not as easy to cure clover as timothy, as our seasons are. The more a thing is worth the more it costs.

# CHAPTER XVII.

## MANURE SAVING.

FIFTY years ago farmers in this section paid but little attention to the saving of manure, any more than to drainage or tillage, or clover growing. They did not need to. The soil was new and strong, bringing large crops anyway, and their whole attention was given to clearing up their land and getting a home. When lands have been cultivated for some time, and the original fertility begins to fail, we find the farmers giving more attention to the saving of fertility, some in one way and some in another. I was rather surprised, when attending institutes in Wisconsin some years ago, to find that manure saving was not a popular subject. Their lands were somewhat exhausted by too exclusive wheat growing, but were still too rich to have them pay much attention to the subject of tight stable floors. It is somewhat this way in Southern Ohio, but in the northern part of our State, there are quite a good many farmers now who save their manure as thoroughly well as we now know how. There are many different plans followed in this and other States. Some use a cellar under the stable to store their manure in, having, of course, a cement floor. The manure is shoved down through trap doors, and may be thus kept perfectly. The objection is odors arising from the manure. Plenty of absorbent and land plaster and tramping, with some light stock, I should think, might nearly overcome this trouble. Others have cisterns and lead the liquid manure to them from the stables in tight gutters. Then it is drawn out in water carts. Where straw is scarce or brings a high price, as near large cities, this may be a wise plan ; but I do not like it exactly. I believe I can do better on my farm than either this or the preceding way. Neither the liquid or solid manure are complete alone. Common sense, therefore, would seem to indicate that they had better be used together, and if used together, why not saved together? You have to go out with the solid, why not have the liquid absorbed and go right out at same time ? This has always seemed to me to be the best plan for most of our Ohio farmers, who have an abundance of straw which has little market value. I would have the stable floors absolutely water-tight and save solid and liquid together by free use of absorbents.

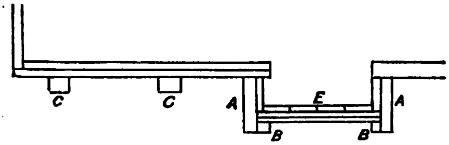
Of course, this is for sections where stock are kept in barns or sheds during the winter. as nearly all are now kept in Northern

Ohio. I can well remember when they were not thus kept. As we go South to-day, even 100 miles, we find many animals kept out doors exposed to the storms. But farmers are improving in this respect. They are finding out that a part of the animal heat can be kept up cheaper by shelter than by burning hay and grain in the animal's stomach, and that when sheltered the manure can be made worth a great deal more. What we want is good, comfortable shelter for all animals, and to keep them under cover most of the time. Have water in the yard, if not in the barn. Thousands of loads of manure are wasted by stock going down long lanes or off a distance for water. On many a cold, frosty morning, in Ohio, have I seen from the car window a fine, large barn, and stock out eating on the snow in the yard, or on some side hill where the manure would be largely wasted. The time is passed when any money can be made keeping cattle in this way, in Ohio at least. In most lines, of late years, one has done well to get paid for his feed and labor, and the manure was all the profit he could possibly figure out. Can he afford to waste half or three-fourths of it? Shelter need not be costly if it is only warm and comfortable. This preaching is simply what I have practiced as fast as I could get around to it. For example, I told you in a previous chapter of the cows drinking in the winter at a hole cut in the ice in one of those frog ponds that we have since drained. This was the best I could do at first, but I could not afford to have my stock exposed to the storm and cold while going there for water, nor could I bear to waste the manure that was badly needed elsewhere. By the way, all around where they used to leave their manure, the wheat is lodged to-day. It was worse than wasted. The first change made was to dig out a spring some forty rods from barn, and let water run out in a trough, and I drove cattle there and staid with them till they got through drinking, and got them back under shelter as soon as possible. Thus they got warm, pure water instead of filthy ice water. This was an advance, and cost me nothing but a little work. The next step, which was taken just as soon as I could possibly stand the expense, was to dig a well at the barn. Then I had water some 20° above freezing, and could save all the manure and the stock from exposure. My yard was small and I let out ten or fifteen head at a time, pumped them fresh water as they drank, and at once put them back in a warm, comfortable stable, and let out another lot. When through, I cleaned up any manure in the yard and put on the pile. If it was very cold or stormy we watered in the stable, as I could pump water right inside. This was more work, of course, but "there is no excellence without great labor; no pains, no gains."

But now we have settled on a general plan of manure saving, in what way shall we manage to make the stable floors tight? The liquid manure is equally as valuable as the solid, and no farmer in our section can longer afford to let this quietly drain away through cracks in a plank floor or soak into an earth floor. The waste is little by little, but quite a large sum in a year on many farms. The best floor for a basement stable to-day is cement. This saves every drop. It need not cost very much. A farmer near here lately built a very large basement barn. Perhaps fifty head of horses and cows are kept in the basement. He drew gravel himself, bought cement, and mixed and laid it all over the entire ground floor, with a gutter behind the cows, and it gives complete satisfaction. I have seen a number of other barns where the floor was laid in the same way by the farmer. One had better get a good mason to advise in the matter of mixing, and, perhaps, show them how to mix and lay, unless they have had some experience. In a general way, I will say, I would make floor 2½ to 3 inches thick, the latter, I believe, being enough for horses even. I would use clean gravel and sand with no soil in it. I would lay right on the solid, settled earth, without any base of stones, as was once thought necessary. Of course, the floor must be dry and well drained, and it must be solid. If it settles in spots it may crack the cement. I have seen one thus injured. I would use best Portland cement myself. It costs more, but I believe will be cheapest in the end. I have seen good gutters behind cows laid of this grouting of gravel and sand and cement. The corners were rounded off a little. I laid a floor in my horse stable of pavement blocks (burned clay) bedded in cement (Portland) and cement in all joints. It is six inches thick. If a roof is kept over it, it will be there after I am forgotten, but it was unnecessarily costly. It cost, with expert labor hired to lay it, $20 per box stall of about ten feet by twelve. I could have built a floor of gravel and cement for half that, and good enough.

But a cement floor costs money, even if one does the work himself. I might tell you how we did at first, when we had no money. That first winter when I came on the farm and had those nine cows, I fixed to save all my manure. I knew it was farm food, and my farm was sadly hungry. I went to the edge of swamp where there was some tough, blue clay, and dug out some, and drew up and spread over stable floor. Then I wet it slightly and tramped and pounded it—puddled it—until it would hold water perfectly, and then I covered it with old boards to shovel on and keep cows from displacing it. This was a pretty crude floor, but it saved the liquid manure all the same. The horse stable had a plank floor, in fairly good order, and I got some pine boards jointed and nailed down crosswise, so they practically prevented any waste of liquid when swelled, by keeping horses well bedded. But the clay floor was not very nice or lasting. It would dry up and crack in summer. My first advance was to build a floor for cows of lumber and gas tar. This was, of course, a temporary affair in our old barn. It was effective for about eight years. It was built right on ground in basement. Would last much longer up from the ground. Some such plan may be best to-day for a stable above ground.

This floor cost me about $2 per cow for material and labor, about the same that a cement floor would cost now. But lumber would cost much less in some sections, and cement more, or gravel be hard to get. This made a real good floor, I can assure you, while it lasted, and paid for itself several times over. As we built it, A A were two-inch white oak planks, 12 inches wide; B B, 2 x 2-inch oak strips, spiked on planks and bedded in lead and oil; C C, 4 x 4-inch scantlings bedded into ground to nail boards to for the floor. The cross-boards in the gutter were of one-inch pine 26 inches long, which made gutter when finished about 8 inches by 24. For these cross-boards and for the floor I used pine barn boards, all 12 inches wide, which saved trouble in breaking joints. The boards running lengthwise, shown at E, were put in for convenience in shoveling. We put a coat of hot coal tar between each course of boards in the bottom and side of gutter, and between the two courses of floor, filling every crack full, and this, together with care in breaking joints, made a water tight job. This floor and gutter was used with stanchions for fastenings. I preferred a deep gutter, as cows are not as apt to stand in it, and one can keep them cleaner, and in case of a bad storm we were not obliged to clean out stables every day. In fact, to save money, I did not often clean them every day, anyway. I found a man would be nearly as long wheeling out one day's manure as two, that is, getting at it and over it and all. It cost me about as much. I had to make labor count in those days and figured close. A little dry muck or land plaster used often will keep the manure from fouling the air. Mr. Gilbert, President of New York Dairyman's Association, who keeps many cows, told me last winter that he used a deep gutter, about three times as deep as this, and had an iron grate over it for cows to stand on. They work manure through the grate with their hind feet, and he only cleans this out when full. Now he makes fancy butter and gets high prices, and his stable must be sweet and clean. He uses land plaster on the floors and grate and in this gutter by the ton. This is the secret. There is no need whatever of cleaning a stable daily, or oftener, if one does not wish to, if he manages rightly.



Section of Stable Floor and Gutter.

Right here I may as well tell how I manage my horse stalls. They are not cleaned every day and are not filthy either; in fact, they are nearly as sweet and clean as our house. I do not quite mean that, but I do mean they are so free from foul odors, even in hot weather, that coming in from out doors you would seldom notice any difference in the purity of the air. This is good for man and beast. We have box-stalls, but can tie up two horses in each, if need be. Taking one of these box-stalls when cleaned out we will put in a lot of dry straw, say a foot deep. The straw is right overhead, kept there when we thresh, so it is dry and handy. The next morning, and every morning afterwards until it is full, we spread the manure, which may be mostly in one place, around evenly with a fork, level the surface up well, sprinkle it with land plaster, a pint or so to a stall, and then get down fresh straw and spread all over. We do about the same at night. Thus treated, the top is always dry and clean, foul gases do not rise, to speak of; it is a soft floor for horses to stand on, the manure is all saved in a perfect way and can be wheeled out all at once some rainy day. It saves so much choring. No harm has ever come to horses' feet. Of course, the abuse of this plan might make a filthy mess of it. This is no sudden whim, but the way we have done practically for many years—the very best way I know of, for myself. I assure any reader without experience in saving *all* the manure from his horses, and a very few do, that we make about twice as many loads per horse in a year, by weight, and each load is worth nearly twice as much. This is just about the truth of the matter. After taking out to one side the top straw, which is dry, we wheel out heavy, solid manure, entirely saturated with urine, never fire-fanged in the least, all from having an absolutely water-tight floor beneath. When horses run loose in a box-stall they tramp it so that in connection with the wetting from urine, it heats scarcely at all in midsummer. If they were tied it would not do as well. Ours are always loose nights, if tied day times. We do not wheel out until the manure begins to be in the way or raises the horse too much for him to eat comfortably out of the manger. The mangers were built with the bottom up a foot from floor. I have not found a single objection to this plan in practice and much in its favor. It would be impossible to keep a stable with cracks in floors as sweet if cleaned every hour. Few tight floors cleaned daily are as free from foul odors. I once was on jury a week in a city hall that was built over a fire engine house. Great care was taken to keep the stables clean, but the stench in the hall above was worse than you will often find in my barn. I can hardly speak too highly of the use of land plaster as an absorbent of gases. If you have not tried it you are missing something valuable. It costs here about $1 per barrel of 250 pounds and I always keep it on hand. It not only absorbs the gases, but saves them for a fertilizer. It takes but little. Two or three barrels will answer very well in our horse stable for one summer.

But now we have the manure all saved from waste in the stable, what shall we do with it when we take it out? If it is thrown out under eaves, or where much rain water will leach through it, we shall lose much of what we have worked so hard inside to save. Not a few say now, "Draw it directly to the field as you take it from the stable." Where the conditions are right this is a good practice. On land where there will be no waste from washing, and particularly to put on a sod for corn, this is an excellent way to do, and still I believe there is a better, as spoken of in the last subject treated, clover. I am very strong in the opinion that our manure can be used to best advantage on our renovating crop. I know there are advantages in drawing manure out fresh during the winter. Many would save loss in the yard and get work done and out of the way, and done when time was of little value, still it does not necessarily follow that this is the wisest plan. I certainly would never do it where there was danger of surface wash. There is danger on my farm, I know. I spread manure early in March, once, on land that is nearly level, and where the wash was across twelve acres of wheat below, also nearly level, and a large quantity of colored water reached the swamp below, when snow went off with a heavy rain. I waded around in it and could have kicked myself with a right good will for being such a fool. Some say the manure water, passing over soil, all fertility will be taken up. All bosh! This will do to talk, but a close observer in the field knows better. Possibly this might be the case if the wash was an even flow all over a field, but it is not often. It flows off in little rills, finally collecting into a larger stream usually; and most of the fertility goes with it, that is, what water can leach out. Some writers have claimed that colored water is not manure. Absorbents take up the urine in my stable and hold it. I draw the manure out and spread it. Does any one doubt that rain falling on it will wash that urine out of the straw? A neighbor manured a quite level clay field last spring. Late in March I rode by there in a heavy rain and a large stream of colored water was running off of the field and into a nearby creek. There is no question but that he was meeting with considerable loss. Some put the manure in small piles when they draw it out, partly to save washing. I haven't a word to say in favor of this practice. I would not do it. They will waste around the edges and the leachings will make the ground beneath over rich. There are farms where manure can be safely spread on the surface at any time, but there are many where it can not be, and I have one. I was obliged to save it in some other way, and I would not spread now in winter if I could, for reasons given in clover chapter.

Now, how could I best save it in the yard until the suitable ime for me to get it out? I first did it by careful piling, away from the eaves and surface wash. But we must be careful when we pile manure, as it will heat and cause loss of ammonia. To prevent excessive heating I tramped the pile, or rather encouraged the cows to do it for me. All I had to do was to put a couple of rubbing posts on top of the pile, which was broad, and while they were out in the yard they would patronize them every time. It made me some extra trouble in cleaning up around the pile. With care in cleaning up before a rain, we in this way saved our manure in the yard without much loss. There was some. It was not a perfect way, but it was the best we could do. For a time we composted it with muck, as will be told of in a chapter under that head. It was used in the fall to put on our next year potato land. Now we want to keep the manure till July, when it goes on the young clover where the wheat has been taken off. What we want is a simple, perfect way of keeping it in the yard until it is wanted, without loss. We have it in the shape of a roof over a small barnyard. It is simple, practical, perfect, and answers for other uses besides saving the manure. We have seldom invested any money that gave more real pleasure. It comes next to taking the water out of a frog pond and making it produce a bounteous, useful crop. For forty years before I came here the drainage from the barnyard went down into a cat swamp near by. There is no drainage now, not a drop. The fertility goes where I want it. Do not get the idea that this roof is over a great large yard and is extravagant and not practical. We have about 34x70 feet covered, which is sufficient for our purpose. The stable doors open right into it, of course, and from them the ground is graded down slightly so the most of the yard is some 18 inches below the level of stable. This gives a chance for the accumulation of a good deal of manure before it is level full. It is spread all over the floor, of course, evenly, and we walk and drive right over it. It is never piled. This gives us all the yard to use just as though no manure was there. I will give you plans and pictures in another chapter entitled Our Barn. The covered yard has a ground floor. A cement one is not needed, as no rain falls on manure and there is no leaching. When we begin to wheel out manure we cover ground with wheat chaff and put manure on it, which prevents any possible loss. Plenty of straw is always used in the stable to absorb all liquids. If manure is spread evenly, in thin layers, in winter, and tramped by any stock in yard, it will not heat any. So there is no loss upwards.

In summer our horse manure needs a little sprinkling as it is spread, and then we use a little land plaster on top after it is all out, and take a horse and tramp it down some. A little dry straw is thrown over the top when all done, to make it clean to pass over and keep it from drying. This is a little work, but we do it rainy days, and it makes good manure. In the hottest weather there is no fire fanging whatever of manure in this shed. It is saved perfectly. But it must be handled as I say, and tramped. We manage so as to keep the air from it mostly. Pile it up and it would be steaming in a few hours. We do not dump the wheelbarrow all in a place, but spread the load with fork. It is worth the care to us.

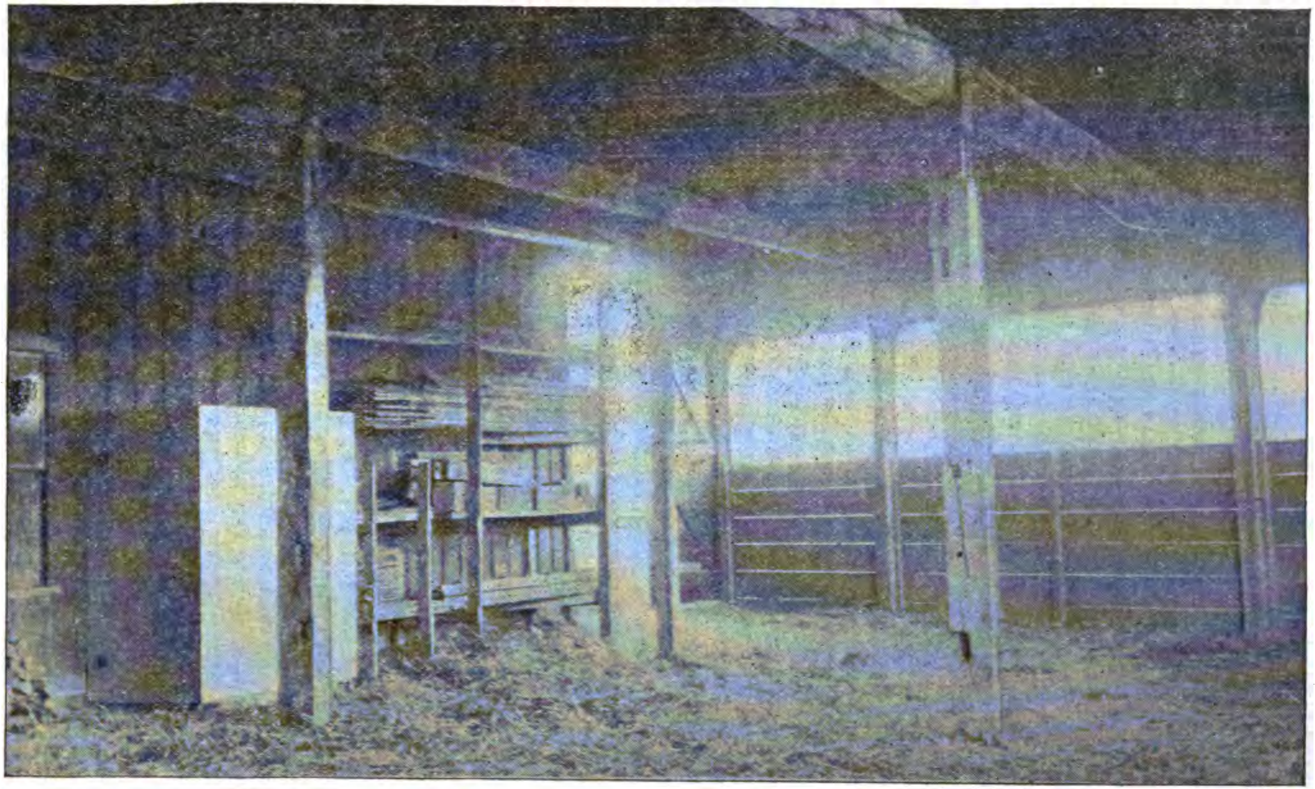
We have water in the yard, of course. The well dug by the old barn is 130 feet from the place where we wanted to draw water in the new one. We draw it that far readily, with pump. Particulars in another chapter.

# CHAPTER XVIII.

## MANURE (CONTINUED).

IF we kept cattle now we could turn out, say, ten head at once in our covered yard to drink and stir around a little. In any ordinary weather, I would prefer this to watering in the barn. A covered yard large enough to turn out forty or fifty head at once would be rather expensive. One can change his practices a little to fit new conditions. I did this way years ago, so as to have a small open yard and better save manure. It is quite a job to get out this manure after it has been tramped over so much, where long straw is used. It comes up harder than out of a pile. It would be worse yet if we fed long corn fodder. But all good things want to go together. With the covered yard I would put the corn in the silo, if I kept stock, or cut the fodder, at least. Then there would be no trouble with the manure, and it could be made to pay otherwise. The way I manage to get manure out is to have my man shake it up with a fork while I am gone out to spread a load with the manure spreader. He can just about do this, and then it is in shape to handle faster. Two of us can load the spreader quickly. If taken up in tough, large flakes, the spreader could not handle it. Shook up fine in this way it spreads this strawy manure very well, well enough to not smother young clover. If stock are let out to run and exercise on the manure from day to day, it helps about the spreading. They break it up a good deal by tramping. I have noticed that a load taken fresh from the stable did not spread nearly as well. There is a good deal in loading just right, too, as one will learn by experience. We have used a spreader ever since they first came around, some ten years, and could no more think of doing without now than we could rake hay by hand. It is just like this: The team can spread a load in about two minutes, while I am resting. I like that better than working hard myself for a much longer time. I would like to sit still and drive while the horses did the loading, too. But the machine spreads better than it is practicable to do by hand. It pays me in this line alone, and it spreads a load on just the same ground every time. If I set it for fifteen loads to acre, I get just that, no more or less. Again, it will spread a very light coat, even five or ten loads per acre. Who can do that practically by hand? In top dressing I sometimes want to make a little manure go a good ways. There is much in the spreading of manure very finely. Before I got a spreader, I always took great pains in this respect, and harrowed and bushed after the best hand work. I would like to wear the manure all out, so you could hardly find a trace of it. One can thus make the most out of it, beyond all question. And still I see many fields roughly covered and plowed under in this shape. Often, I believe, I could get twice as much out of it. I want fine manure with fine tillage. I would like a trace of it in every square inch of soil, if possible. How very far short of this many come. The spreader does not seem to give satisfaction on very large farms, where they have a long distance to draw, as it does not hold load enough. However, I believe a larger size is now made than the one I have. It is all right in this respect on my little farm, with fields mostly right around the barn. It will not work well on side-hill farms, if they are too steep to go up and down. On ordinary rolling land it need not draw hard. My lightest horses will handle it readily. But it must be in order, or it may be a regular horse killer. It must be well oiled and cared for, and kept under cover when not in use. It is no small job to get it thoroughly oiled in every place, and some will not take the trouble. We get ours out under the covered yard some rainy day beforehand, and get it in perfect order when we are not in a hurry. This is not an advertisement, but a farmer's experience. I bought mine of an agent at wholesale price, for cash down, and have never met one of the firm or had a letter from them. Tools are sometimes sent me to try, but always with the agreement that I may say just what I think about them after trial, and many have been sent back, and the reasons given in my articles in the papers. Our yard is sheltered by barn and tool house on north and west sides, and planked up seven feet on east and south sides and then open five feet above to let in air and sun. It is about twelve feet high on one side and fourteen on the other (nearly flat roof, covered with tin), just high enough to answer our purpose. We had plenty of storage room in main barn, and had no need of more over covered yard. Some farmers, if building one, might to advantage build higher and use room overhead for storing straw, fodder, etc. The method of supporting roof can be seen from picture given, which was published in *The Practical Farmer* a year or two ago.

We have three posts in the middle, and the beams are supported in other places by iron rods, three-quarters of an inch in diameter. Our tin roof has never troubled any, only needs to be kept painted. A light coat of boiled oil and Iron-clad paint is best, once in two or three years. It should not be too thick or it may peel. You should particularly notice that the yard is open to the east and south—the warm direction—and sun can and does shine in and across yard in the morning freely and part way across at noon. A dark, gloomy yard would not suit me, any more than a dark stable with no sunshine. Also remember that the manure



Inside View of Covered Barnyard.

within is covered with enough absorbent, always, to make it dry and decent. Thank God that I am out of the mud around my home. No more wading in filthy barnyards. Slippers can go now where once rubber boots were needed.

Some have built a roof over yard and enclosed it entirely. For example, Hon. J. C. Thornton, near Erie, Pa., has a large yard thus enclosed which I have visited. He has large sliding windows on the sides that can be opened in pleasant weather and give plenty of light, and then when it storms he can have a tight shed. He spreads manure from cattle in the yard, and keeps his sheep in there all the time, feeding in racks right on the manure. He has also a large skylight to make yard more pleasant, but it is perhaps four times as large as mine. I am often asked whether snow and rain do not come into ours. They do not so as to bother particularly. If we kept much stock we might enclose with large windows and leave them in the yard more. As it is, it is very satisfactory. The total cost of our yard was about $300, all material and labor counted. The tin roof is the great cost. I would not think of taking $1,000 for it, and agreeing to not build another, it is so convenient in many ways. One great advantage I will speak of in another chapter under the head of Care of Farm Tools. Briefly, this is a capital place to run tools, wagons, etc., under temporarily when we are using them and when no stock are in the yard, as there are not in the summer with us. Now it seems to me this roof over a small yard is the best possible way for me to keep my manure over until proper time to put it on my land. Some advise a pit out in the yard. It would save the manure if built of cement, but there would be more water to draw out (what fell from the clouds); it is not so handy to draw manure from as from this yard, and it cannot be used for any other purpose, while the yard has many uses and shelters man and beast and prevents all mud, and work can go right on when it rains. For the same reasons I prefer the yard with a roof over it to a manure cellar under the stable. Of the many visitors who have been in my yard, every one has been delighted and said it was just perfect. A description does not do it justice (see other pictures in Chapter XXIX). I can certainly point you to farms in this section where manure is kept over for wheat, where the waste around the barn in a wet season, as it is kept, would be more than 20 per cent. interest on the cost of my yard, and it would save all this loss, besides being worth as much more in various ways during the year.

Just at this point I stopped to read my mail and found one letter from Chas. Hakes, of Oakwood, Ohio, asking all about manure spreaders, and particularly about how many loads of manure one must have in order to make one pay. I get a letter of this kind about once a week, and often the writer wants to know whether he had better run in debt for one. This latter I never advise, although it might be wise sometimes. But one has no business advising a stranger to run in debt. As to the amount of manure one should have in order to afford a spreader, I cannot answer much better. I have given carefully the advantages above and prefer every one should figure for himself. One would save time enough in spreading 150 to 200 loads, on my farm, to pay interest and wear and tear, but the better, finer work is very important also. If I had shelter for it, and money to invest, I would not think of doing without, myself, with no more than one hundred loads of manure a year, or even less. Life is too short to put my strength against machinery. Ten dollars a year will cover interest and wear with me. Labor saved, and better work, are safely worth ten cents a load to me. But, frankly, many persons buy spreaders and do not make them pay.

I live in a dairy section, and there are many stable floors that leak, letting the best of the manure steadily go to waste, and worse than waste sometimes—go down into the earth to pollute the well water, or render the air impure about the premises. And then many of these very men buy fertilizers. Perhaps it was a little rough, but I have sometimes asked these friends what they would think of a dairyman who would milk his cows, set the milk, skim off the cream and throw it away, feed out the skim milk or make it into cheese, and then buy his butter to eat. Of course they could only say he was a simpleton. But how much different is it to waste the very cream of the manure and then buy fertilizers—buy back in bags what they have allowed to go to waste? They do not fully realize what they are doing, is one great trouble. Familiarity begets unconcern. They have always done so, and their fathers did, and they do not think anything about it, while beyond all question, sometimes a cement floor and manure saved and properly used afterwards would pay better than any other investment of equal amount they had made on the farm.

An amusing instance of going along blindly without thinking or studying was given by my friend, E. C. Ellis, at an institute last winter. He happened by a field where a man was burning straw before plowing, and stopped and had a talk with him. He finally drew out of him that he had bought a certain quantity of such a fertilizer to use on field. Then he got an estimate of number of pounds of straw burned, and then quietly told the man he had burned up forty dollars' worth of nitrogen and paid just forty-eight dollars for nitrogen in his commercial fertilizer. Mr. Ellis was then inspector of fertilizers, and knew about their ingredients pretty well. I saw myself last winter not a few straw stacks burning. Often to hasten the job they had pulled the stacks to pieces and scattered them around some.

In regard to the matter of fertilizers I do not care to say much. I do not use them and never have except by way of experiment. These experiments have been full and careful and carried on in quite a large way for several years. They have never done me one particle of good. I have used a complete fertilizer containing all the ingredients needed for plant growth in proper proportion, as we are told, and at the rate of as high as 1000 pounds per acre without any result. I might just as well dump a carload of fertilizer in the fence corner as put it on my field. And I have met plenty of others who have had the same experience. This is no doubt largely due to the fact that my clover sod on which I plant has fertility enough in it, and any more is simply excess. Pretty good for clover, isn't it? I asked Prof. Thorne, of our Experiment Station, what he thought of this idea the other day, and he said: "For three years past neither corn nor wheat when put on clover sod has shown us any benefit from fertilizers. If we continue same field in corn or wheat, fertilizers show afterwards more and more as effect of clover passes away." But I do not ever continue them in same crop, but put in clover again and get more fertility, and hence fertilizers never get a chance to show.

Fertilizer men are often claiming, or saying positively, that their fertilizer is not a stimulant, but a plant food just as much as stable manure. This cannot be practically true. Analysis may show the same ingredients, but they do not show same results. Analysis shows my muck to be worth about the same as manure, but practically it is not. I have no land on my farm so rich that a load of my manure will not show every time where it is put, even when spread quite thinly. It will show on any crop grown. If it fails from drouth on first crop put out, it is there on the next. If fertilizers are just as truly plant food, why do not they show just the same? I have put two handfuls of complete manure around a strawberry plant, part at a time and worked it in, and manure around another, and the former had no effect whatever, and the latter did. As it might be lack of water, I watered thoroughly several times, both alike, and the other plants they were compared with, and the experiment was duplicated. I have asked many wise men, chemists and professors, to explain this. Prof. Lord, our State chemist at the time, said it might be owing to the lack of vegetable matter where the fertilizers were used. I tried them on soil where a heavy crop of clover was plowed under with the same result. Knowing these facts, it is useless for any one to tell me that fertilizers are just as much plant food as manure. They do seem to be on some soils, but they are not always so. They do pay beyond all question on some soils and under some circumstances. On many they do not. The farmer who takes for granted that they are as safe and actual food as stable manure, under all circumstances, may get badly sold. Perhaps you may think I got poor samples to test. Fearing this might be the case I sent to the manufacturers direct for special sacks, two or three times. It will be wise to experiment with them in a small but accurate way, and be governed accordingly. Had I not done so I might have lost hundreds of dollars. I am of the opinion, from careful observation, that fertilizers have not paid our Ohio farmers, as a whole. It is worthy of notice that our Experiment Station, in tests at different points in the State has not, on the average, found that they paid. Director Thorne has lately issued a pamphlet entitled: "Forty Years of Wheat Culture in Ohio." To this subject he has given a vast amount of patient study and thought, and he is an exceedingly careful man. He concludes with, "These statistics indicate that the wheat crops of Ohio have been slightly increased by the use of commercial fertilizers, but it appears that the average cost of this increase has equaled its market value, and that a general improvement in the methods of agriculture has contributed more largely to the increase of Ohio's wheat crops then the use of purchased fertility." Now I would not for anything lead any one wrong, but this I believe: That you may save manure because it has paid someone else to do it every time, but you must not buy fertilizers because some one else advises it; nor would I have you drop them or leave them entirely alone because I say so. Know certainly that they pay you on your farm, and then go ahead. But you need never wait to know about saving manure if you use what you save properly.

Manure is anything that fertilizes land. We may save fertility or manure by paying attention to what we are selling off from the farm, or what we are bringing onto it by way of purchased feed. Wherever stock keeping in any line is a leading feature, I would buy fertility if I wanted it in the shape of wheat bran, oil meal, or cottonseed meal, raising on the farm the proper coarse food to go with this—hay, corn fodder, ensilage, etc. With good business management one should get nearly or quite the cost of his feed back in money and an increased value to his manure. With cement floors and other good care of manure, this plan can hardly fail to pay. I would bring a farm up in this way every time, if I were starting on a poor one, in preference to using fertilizers. I believe I could get real fertility cheaper, particularly if I kept dairy. I do not hesitate at all about advising the purchase of fertilizers in this shape, providing the purchaser will do his part in the way of saving and using the manure. You will remember I purchased some fertility in this way when I began. I would buy it to-day in this way to use on a farm that was run down so I could not get clover to grow well. I would buy fertilizers, too, if they would help me as I knew to get a good stand of clover; I would use them as a starter but not as a dependence. I could do better.

But now in regard to what we sell off the farm. Some products carry off fertility much faster than others. I paid a good deal of attention to this. For example, in selling one ton of butter I would take off but forty-eight cents' worth of fertility, and my friend William H. Gilbert says: "You need not sell even that much if you do not get any manure in the milk." Above all others, this is the product to sell when one wants to bring up a farm, leaving out all other considerations. Let me give you a table to study over lately brought out by Geneva, N. Y. Experiment Station, showing the fertilizing value per ton of different articles. This value is based, of course, on the value of fertilizers in market.

| | |
|---|---|
| Cottonseed meal, | $28.68 |
| Linseed meal, | 21.42 |
| Wheat bran, | 11.65 |
| Clover hay, | 8.20 |
| Crushed oats, | 8.17 |
| Cornmeal, | 6.31 |
| Timothy hay, | 5.48 |
| Oat straw, | 2.58 |
| Wheat straw, | 2.21 |
| Butter, | .48 |
| Potatoes, | 2.02 |
| Milk, | 2.80 |
| Wheat, | 7.09 |
| Cheese, | 20.83 |
| Fat sheep, | 8.14 |
| Fat calves, | 10.55 |
| Fat oxen, | 11.80 |
| Fat pigs, | 6.92 |

It is an amusing fact that a noted advocate of fertilizers gave this table in *The Ohio Farmer* last winter with all the figures divided by two, as much as to say they were twice too high for practical use. He forgot, or did not think, this was virtually saying that fertilizers were only worth half market price. Comparatively speaking, these tables are correct. Now notice, first, the great value as a fertilizer of the cottonseed meal, linseed meal and bran that I have just spoken of. Notice how much faster cheese will run your farm down than butter, if you sell it. I sell potatoes and wheat. The potatoes are mostly water—a pretty good thing to sell, only $2.02 worth of fertilizer in a ton, and I get usually not less than $13.20 a ton for them, and sometimes twice that or more. Suppose a man sells timothy hay. He may think he is doing as good farming as I. Thousands of tons are sold in Ohio as low as at $6 a ton. At one institute where I was, the statement was made that over 2,500 tons of timothy hay had been shipped from that station during the last eighteen months, bringing the farmers on an average $6 per ton. An average yield, or rather a good yield, we will call two tons per acre. This brings $12. It contains $10.96 worth of fertilizer. Two and a half tons would be a big yield. This would bring $15 and contain $13.70 of fertilizer. My average crop of potatoes is nearly six tons per acre, say. These sell on the average for about

$100 at the station. The fertility carried away is $12.24 per acre. This is not materially different in amount from what a large crop of timothy would take from the farm; but where the timothy man gets $1.30 per acre over fertility sold off, I get $87.76, a tremendous difference. It is a ruinous business, I should say, when one gets but little more than the fertilizing value of his products. I have known men to sell clover hay for much less than its fertilizing value, actually. I will turn mine under every time rather than to sell off the farm, and use it to feed crops that I can sell, so as to get a good deal more than the mere fertilizing value. I averaged about a ton of wheat per acre for a long term of years. This takes off $7.09 from an acre, and last year (1891) brought over $33 a ton. I get a good deal more than market value for the fertility I sell.

Again, there has been a great deal said by certain persons because I did not keep more stock. I hold that I am actually doing better farming, drawing on the vast store in the soil and subsoil less, than a great many who keep stock largely. Men should know that they are right before they find fault with those who do differently. I think I know what I am about, at any rate I have studied over it hard enough. Now, if I were to grow corn instead of potatoes, and feed it with clover to beef cattle, and sell beef off the farm instead of potatoes, no fault would be found with me. That would be good farming, selling concentrated products, feeding out what you grow, etc. Well, I suppose for a ton of the very finest fat cattle I might get $80 in these days, and it has been about the same for a good while. That is putting it full high, though. I mean $80 at the station here, of course. And with every ton sold $11.80 of fertilizer would go. With $80 worth of potatoes less than that amount of fertilizer is sold off the farm on the average. Selling beef cattle would remove from the soil per $100 worth sold less potash than selling potatoes, but my soil is abundantly supplied with this, so much so that an application of ashes shows no effect whatever so far. The selling of potatoes removes from my soil less phosphoric acid than if I sold fat cattle, and this is the ingredient I think that my soil has the smallest supply of. The amount of nitrogen sold is not materially different in either case. But that is the substance that I care least for, as I can or do at least get enough of that from clover growing and careful saving—not letting manure heat, keeping some growing crop on land as nearly all the time as possible, etc.

I think now you can see where I stand on the manure question. No man does or can save what he has any more carefully than I. It is plant food. We are not likely to ever get enough, say nothing of too much. But unless we sell butter mainly, one cannot farm without selling off quite a quantity of fertilizer yearly. I propose to sell enough to live well and make money as long as this does not materially reduce the yield of my crops at least; but I will manage every time so as to sell what will bring me the most money in proportion to fertilizer sold. As my farm easily yields four times as much per acre now as when I took hold of it, does it not look as though I had cared for it pretty well while making money for myself?

# CHAPTER XIX.

## PREPARING FOR POTATOES.

On my farm can be found almost every variety of soil, from muck and sand to heavy clay. The land that, one year with another, brings the largest crop of potatoes, and has for many years, I would class as a rather heavy loam. You could not call it a sandy or gravelly loam. It is heavy enough to not be leachy, and to stand drouth well, and still is light enough to drain fairly well. It is just about on the line between soil that will pay for draining with tiles, and that which will not. The subsoil is moderately heavy, of course, like the soil, but not so as to hold water long unless puddled. This land would be seriously injured by being tramped by stock when wet, or being worked too wet. In such a season as the present unusually wet one, it would be better if all tile-drained. I could give you the percentage of clay in it, but this description will be better, I think. Next in value comes my gravelly loam. This has more gravel in it than the other, and drains quicker and better. In a very wet season it is the best, and grand. I have dug at the rate of 400 bushels per acre in such years, on the small gravelly spots. But in a dry, hot season they will burn out and not produce half as much as somewhat heavier, cooler soil. My sandy loam, which is considerably lighter than the best land, from a greater percentage of sand, is good. The potatoes come out nice, bright, and clean. It is easier worked than any other soil we have. The crop on it is quite uniform, but not as large as on rather heavier loam. If I had unlimited quantities of manure I would take the sandy loam. If the sandy loam had a heavier subsoil it might be stronger. Mine has a light subsoil. The ideal potato farm that I would pick out would average rather heavier than what is commonly called sandy loam, enough heavier so that a good farmer would think it wise to tile drain parts of it, and then I would tile every rod. Yes, I would, after this year's experience. Of the last eight weeks in May and June it has rained almost constantly during seven. With my land all tiled two rods apart, sandy loam and all, I would have been able to go through even this season all right, or with slight loss. We have heavier land than the loam mentioned. Perhaps the next grade might be termed clay loam. In this the percentage of clay is larger, and tile drains are needed every time for potatoes, or wheat or clover. Well drained two rods apart, this does fairly well. Some years it will grow a great crop. But in an excessively wet time, long-continued, although the drains may prevent a drop of water standing on the surface, the crop doesn't look quite right, and the yield is apt to be disappointing. They are more apt to rot, too. Then we have some heavy clay soil, some we would like to give away if we could get it out of the lot and not spoil the shape. On this potatoes never pay any profit. It would be exceptional to get 100 bushels per acre from this land. I presume it might be lightened up by plenty of vegetable matter, but I haven't tried much to make potato land of it. It will grow clover and wheat, as fine as need be, and usually potatoes will grow so as to not look badly, but it is too solid for good results. And it is a great deal of work to prepare it for a crop and work it during the season. A friend of mine was here lately who has all heavy clay soil. He said he did not believe he ever in his life had more than 100 bushels of potatoes per acre. He came here with the idea of going into potato growing more largely, buying a planter, digger, etc., and making more of a business of it. He has his land tile-drained, and he has a fine herd of Jersey cows. He thought that by plowing under clover he could lighten his clay soil enough for potatoes. Well, I discouraged him from trying. I told him to not only not go into the business, but stop growing the two or three acres that he now did. There had been no money in it for him, and with great labor there never would be any certainty of good profits. He had better by far grow products for the dairy, and push that further and higher. That pays him and is better suited to his soil. In these days, where one has an outlet to good markets, as most do in this State, it is far wiser to grow what one's soil is best fitted for, and a good deal of it, rather than partly something in which there is no profit to him, but which may pay another man, on suitable soil, grandly.

If you haven't a soil reasonably suited for potatoes, don't go into the business; don't be led into it at all by what you read of my success, for you will only meet with disappointment if you do. The most of my soil is fairly well fitted for the business. Rather say to yourself: "Terry had a potato farm and he found it out and pushed it and made it pay. Now what can I do best on my farm, and push as he has his potatoes?" With this spirit read on and get all the inspiration you can, and success to you.

Except for raising very early potatoes for selling green, I would prefer that part of my land that has an easterly slope, or even a northerly. Some years the crop with a southern or southwestern exposure suffers more from the heat. Really I fear an excessively hot week without rain, say when the thermometer gets to 95° or more often, than I do six weeks without rain if it is only moderately warm. Extreme heat is bad for the potato, and one is powerless to do any thing to help in such a case, as he is in the case of extreme wet; but with proper preparation, we can stand dry weather very well now. I honestly believe that I can grow 100 bushels of potatoes per acre on my land (except the clay) without a drop of rain, from planting to digging time, if not excessively hot. With plenty of vegetable matter in the soil and fertility and tillage we are quite independent. When extreme heat comes the eastern and northern slopes will stand it best. Some southern growers have told me that 95° to 98° in the shade was death to their potatoes very soon, wet or dry. On my farm I do not fear heat with plenty of rain. I would not select very rolling land for a potato farm, but rather nearly level, or just a gentle slope. Side hills wash too much, and such tools as planter and digger and manure spreader do not work as well. It would be easy to get a farm better than mine in this respect. Our main trouble, however, is with washing. We have lost probably $30 worth of potatoes during the past week by the washing of a sandy loam side hill, and not a very large one, either. Short rotation helps, but we cannot entirely stop it, and such washing will keep land poor.

Does the kind of soil they are grown on have anything to do with the quality? Certainly. On such soil as I have advised, you can grow the very best quality, provided the manuring and tillage are of the right kind. On a muck soil they are generally of poor quality, and I think on most black soils. The clay potatoes are not as good to my taste. You can notice in market that in a year of scarcity and high prices, which is apt to be a dry year, muck potatoes go pretty well. Anything sells then. And they are better in a dry year. But when potatoes are cheap and plenty buyers are particular about quality. And I think the method of manuring has much to do with quality. I do not believe you can grow as fine quality on fresh manure as on rotten or on clover sod. Apply the manure to young clover and let the clover feed the potatoes, I believe to be one of the best ways, if it is fresh. If rotten you may safely apply to a clover sod the fall before planting. But I believe it wiser to use the fresh manure to grow the renovating crop, as I have explained about elsewhere. Fresh manure put on a clover sod for corn and then sowed to rye in the fall and plowed under in the spring would be in excellent shape for potatoes. There are many good ways that one might manage. But bear in mind some general facts. Fresh manure does not make best quality and is apt to make scab worse and perhaps the rot. Manure fed to clover loses these objectionable qualities, and comes back with good interest. I simply dare not spread fresh manure on sod during fall and winter and spring, to be plowed in spring for potatoes, on my farm. I once suffered badly from doing just this. We had some 300 bushels per acre, but my! how scabby. Let me tell you the plain truth. We had 1000 bushels in another lot, fed on clover only, that were entirely smooth and nice, and we had some 1500 bushels of these scabby ones. I dug them and put them separate. A buyer came and quickly offered me my price for the 1000 bushels. But I knew I must make the good sell the poor. Well, after much time I sold the lot to him for five cents a bushel less than he offered for the 1000 bushels, and agreed to hand pick the 1500 bushels, and take out 200 bushels at least of the poorest and then mix the two lots in the car, putting the *best on last*. No more of this kind of work for me. And still I have neighbors who put fresh manure on potato land and are not troubled yet. I cannot say why, whether they have not the germs of scab in their soil, or whether manure made on a cement floor with all the urine in it makes a difference in the result. But I find that many are afraid to use fresh manure any more.

Some manure in the hill, but this now is mostly done by gardeners and not by large growers. I would not think of doing so. Get the manure mixed all through the soil as thoroughly as possible. The roots will find it and it is better for them to be encouraged to spread out and feed widely. In case of drouth they are in better shape to get all the moisture there is. Spread manure very evenly in the fall on sod, if you prefer this plan, and let the rains wash it down. The roots will practically prevent waste and it will be well mixed in with the sod in the spring, and then you plow with a lap furrow, not too flat over, and the fertility is well scattered all through, but principally in the lower part, where potatoes naturally like to have it. Corn will feed on manure nearer the surface and sun to advantage (hence I would plow under shallower for corn). Potatoes naturally love coolness and moisture, and hence a deep soil and food rather deep is best, if the land is well drained. I manured an acre heavily last fall with rotten manure mostly, for experimental work. After the rains had washed it down in the sod all winter, I still was not satisfied, but went over the field twice with the cutaway harrow, which mixed the manure and surface soil very nicely. It was practically all out of sight when I got through. A year ago last spring a neighbor had a sod all covered during the winter and spring with manure, but somewhat roughly. I wondered if he would plow it under in that shape, as many do. He did not, but got a big bush and fairly bushed it until hardly any of it could be seen. That was doing just right. And I think he never had as fine potatoes or as good a prospect for wheat as he now has. We do not want to see how little work we can get along with, but how much we can do that pays well. Thorough pulverization of manure, and mixing with soil where practicable, will always pay well. I have spoken of it before, but can hardly say too much on so important a point.

In regard to how to use fertilizers, I have nothing to say, as they do not pay me on my soil. They do not even show any effect whatever. The time may come when mineral matter may be needed, more than is in the soil, or clover can pump up.

When it does, I am ready to buy it, if it pays. There is much good potato land that does not differ materially from mine, doubtless, and you will do well to read and ponder well how clover serves me as a fertilizer, and, perhaps, learn in that the secret of fertilizers not showing any results. I wish it were possible to know how much clover and tillage, and how much the fertilizer has to do with the yield, on some potato farms where fertilizers are largely used. Suppose I used a ton of fertilizers per acre on my farm, all over the potato field, every three years, fully believing that fertilizers were as truly and surely plant food as manure is, beyond all question. How easy for me to write, and believe, but not know, that my crops were largely due to the fertilizers!

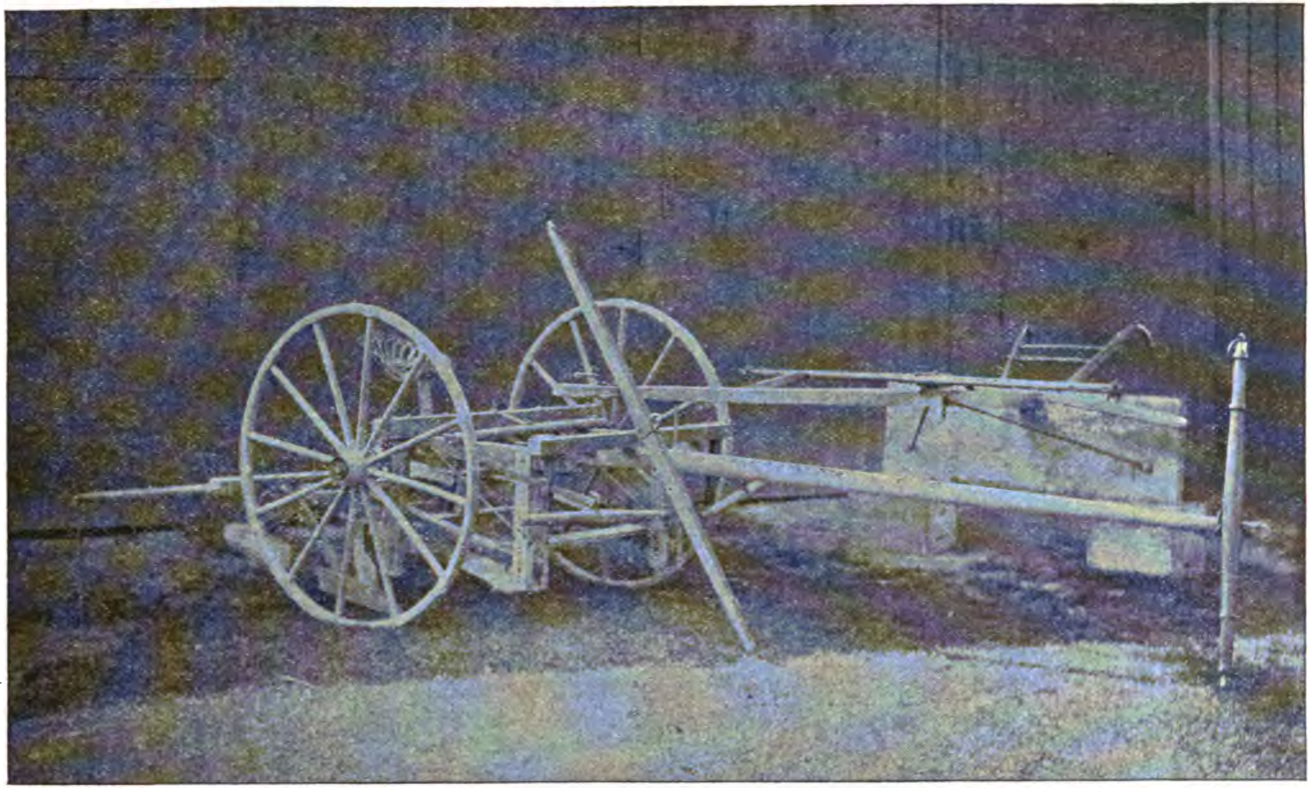
But now we have the soil selected and fertilized properly, how and when shall we plow it? As a rule, I would not plow until quite dry in the spring. Reasons for this have been given in another chapter. There may be exceptions to this rule. Wireworms or grubs in the soil may be destroyed by fall plowing. Some clay soils may work better after freezing, but such are not potato soils. Particularly would I avoid plowing potato land until quite dry, and working it also after plowing. Loose, mellow land is wanted for best results. Always work with this in view, although you cannot always do as you would. I plow a very little deeper every time I break up a clover sod for potatoes. Probably the average is not more than half an inch. When my field was plowed this spring and came to dry, you could see the subsoil nearly all over, a little skim of it. My soil is now about as deep again as when I came here. I can remember places where the plow used to skim along not over four inches deep on the subsoil that one could hardly force plow into without riding the beam. Those places are plowed same as rest of field now. The deepening has been gradual. We have some land now that will stand plowing nine to ten inches deep. I mean to keep on until all is like that. To thus deepen the soil one needs sharp points, and to plow before subsoil gets too dry. I do not suppose it will be practicable to plow deeper than ten inches, on account of power required, and perhaps not advisable if one could. I do not know about this, however. I have seen land plowed two or three inches deeper than usual at one time with injurious results, to the first few crops at least. I heard last winter of a man who put in 100 acres of potatoes the year before, and sold them for $11,000. Last year he got excited, bought a traction engine to draw his gang plows, and plowed, so the neighbors told me, more than ten inches deep on land that never had been plowed deep before. He put in 150 acres, paying some $3,000 for seed, as I was told, and in the fall he made an assignment. The reason which he himself gave for failure was his deep plowing. Now you certainly will not read what I have said so carelessly as to plow your land much deeper than usual at one time.

Late years I prefer to not do a large amount of tillage on land after plowing before planting. The clover sod is pretty mellow, anyway. The clay land in the field needs extra tillage, but the rest may be quite well fitted by once passing over with smoothing harrow with a plank and my weight on it. This, if done soon after plowing, before it dries out, in a dry time, or after a shower when it gets dry enough. The former plan is the safest, because if you wait the shower may not come, and then you have a job working down what would have fallen to pieces with a touch at just the right time. For the clay land the use of cutaway or disc harrow and then smoothing harrow and then roller does best, and then if not fine enough repeat. I confess I used to put a good deal more work on my land before planting, but do not think it pays now on the mellow parts. Heavy rains may pack it all down. Bear in mind, however, that it plows up mellow, and the one harrowing is pretty thorough, with at least three horses for power. I used to use four, but three abreast do about as well as four, two ahead of the others. After the harrowing we roll just ahead of planter. I prefer not to roll any more than is planted, as in case of rain the loose land will catch it better and dry quicker. If it rains before we finish the planting we will probably harrow again before rolling any more, using the smoothing harrow. If heavy and long-continued rains should come it would be well to use the disc harrow or cutaway to loosen up the soil again, and then smooth and roll. If this must be done, I prefer to do it crosswise, and then harrow lengthwise with smoothing harrow. But this does not work very well in a long, narrow field partly planted. I like to get a field all planted before a rain, so as to have it all alike, and usually can ; but this year it was nearly five weeks from the time we began until we got through. Mercy, what a time! I assure you if I hadn't done better some years than this I wouldn't do any preaching. As it is, I feel pretty meek. Never in my life have I been so constantly thwarted. Perhaps it is to teach me not to be so sure man can conquer under almost any circumstances. Well, if it would only let up on the rain and give me a chance to try!

We may as well decide, now the land is ready, whether to plant in hills or drills. I will take the drills every time. This is contrary to what was once best, perhaps, but conditions have changed. With my long strips of cultivated land I want only rows one way, the long way. Cannot afford to cultivate crosswise ; no need of it whatever now. It was necessary once in order to keep crops clean more with horse work and less with hand labor. By cultivating both ways, twice in a row, there was little left for the hoe to do. But this was before the days of smoothing harrows and weeders. Now, we can nearly always, on drained land, keep crop practically clean without any hand hoeing at all, so what is the use of cultivating both ways? Perhaps you will say, only going one way, there is a strip left in the drill that is not stirred. So there is, but until potato tops are nearly half grown the weeder will stir this. After that the vines shade ground so it is not necessary. I will admit that with a potato hook or pronged hoe, one could do a little better work. On a small patch I should do this if desirous of doing just the very best possible; but practically, in a field, at ordinary prices, it will not pay. If one uses a planter he must plant in drills, as this implement will not make rows both ways. Large fields will always be planted in this way, probably, in the future. But I planted in drills several years before the planter came around. I believe I can grow a rather more uniform crop, and slightly larger in this way. Less potatoes are greened by exposure to light (practically none) than in hills, because there are not so many collected together in a place to crack the earth and let in light. I prefer a piece of seed every foot or so in the drill, rather than three times as much every three feet. I cannot grow in drills as many very large potatoes as in hills, nor nearly as many small ones. They are more uniform in size. Possibly they might be fed so as to make them very large in drills, but this is not practicable with our wheat rotation, if we could do it. But now the digging; it is certainly more work to dig three hills than one. Well, yes, if they were all one size. But if one is a large one, having a dozen or fifteen potatoes in, somewhat spread out, and many small ones, and the three are small, having four or five in each, and hardly any small ones, there is not much difference. A single motion of the fork in the hands of an expert digs a hill nearly always. He cannot do it with three in one. I have hired a good many acres dug by hand, and where they were clean and land in reasonable condition, as regards moisture, I don't think it ever cost me any more than it would to dig hills. But now we dig entirely with a machine, and of course it makes no difference to that, or if it does, it is in favor of drill culture.

But what about the planter? Will it really work? Will it do as well as hand work? I bought one of the first brought into Ohio after trying it well. It is the Aspinwall. It will work and drill potatoes fully as evenly as ordinary hired hands will. You can make rows very straight with it and cover perfectly. In a long field I can put in an acre in two hours. The machine does not cut the seed. You do that by hand and put it in, and then ride with nothing to do but drive straight, while the machine plows out the furrow, drops and covers. If you keep it well oiled and do not put stones in with potatoes, and keep your reins out (tie them up in a knot) when driving, it will not get out of order easily. With the tension properly set, it seldom misses of dropping a piece. It is more apt to drop two pieces, which is a slight waste of seed. The machinery for handling seed, dropping, keeping enough in the hopper, etc., automatically, is wonderfully perfect. You can plant up and down hill all right, but not as well along a side hill. It would work on stony, rough land, but don't try it. Better clear up than risk breaking it. It will drop whole small potatoes, or large ones cut even to one eye. It has practically no faults, in good hands, except that it is possible to put potatoes in by hand so they will for some reason yield better. I really do not know why. Now understand me, not one man in fifty does put them in better than the machine will, but my experience is that it can be done.

I first made my drills with a one-horse plow and covered by hand. Next I made a marker that dug out three slight trenches, something like a corn marker, using cultivator teeth to make the little furrows. Then I covered with a cultivator and two horses, putting side shovels on and turning them in at the rear, covering one row at a time. This covering was all right, but the marking was not deep enough. Could not get it deep enough. Potatoes grew out of the ground too much. Disliked to go back to the plow; it was too slow and it was hard to hold in sod, and I could not get rows as straight. I got to the point where I had got to have something that was not on the market in the way of a marker. The planter was not out then. I went to work and made just what I wanted. A right and left hand plow, with mould boards toward each other, were attached under a sulky and spring seat put on, and I had the best marker I have yet seen for potatoes. The plows were held where set, so they did not catch in sod. I could make the rows as straight as with the planter. Next I made a scraper out of a plank about 6 feet long and 20 inches wide, setting it on edge with a pole attached at right angles and braced and then a pair of plow handles fastened on rear side. A very simple thing, but, drawn by two horses, spread about 6 feet apart by long neck yoke and double tree, so they could walk outside of the two rows they were covering, it did wonderful good work. The pair of plows leave earth piled up between two rows, as one is a left hand and one a right hand plow. This scraper levels and pulverizes this ridge as fast as team can walk. I felt bigger than a king when I first used it. I had studied over it until I knew it must work. Sent my men to dropping in the morning and along towards noon went out with this scraper and just slid right along, doing perfect work. Well, here was a great advance. Two rows plowed out at once perfectly, any depth, and two covered at once as well. But we had to drop the seed by hand. After using this marker and coverer for several years with great satisfaction, the planter was brought to my notice. The manufacturer came here. I showed him my tools. He admitted they did perfect work, "but," says he, "my planter will do just as well and fast, as while you mark two at once and cover the same I can mark one and cover it, and then I can save you the money paid out for dropping." Well I agreed to try it, although



My Marker and Coverer.

I had little faith that any machine could drop one-eye pieces of potato. But it did, and went so nicely that I laid my machines aside and did not even put in a row with them. After a few years I began to think, and then experimented some, and then found that my old way of planting would produce a decidedly larger crop every time. I do not know just why. For several years I have been studying and experimenting to find out, but am not yet satisfied. Probably the extra or peculiar tillage given by the plowing out of furrows and the mixing and pulverizing done by scraper cause the increase. The planter makes a furrow with a wedge-shaped plow that packs rather than pulverizes. Could I fully decide where the gain comes from, the planter can doubtless be changed so as to do about the same work. I have taken time to fully describe this plan of planting, because there is certainly something in it. You have heard of the trench system brought out by Mr. Carman of *The Rural New Yorker*. This way is quite similar. Mr. Carman does not know just why his system should yield better, as he has found it does. Large fields will be planted by machinery; but there is a hint here that may be of value to the small grower who cannot afford the tools. Plow out good furrows and scrap the earth back and drop and plant with care, and you can grow enough more per acre to more than make up difference in cost, perhaps. The scraper is a cheap affair, but requires two horses to draw it. The furrows can be made with a hand plow, although not as well. I have experimented with different ways of planting again this season. Will be able to put in result, perhaps, later. I intended to put in more than half my land by hand, but the weather was so unfavorable that when we could plant I put all hands to cutting and used planter mostly. But you can pick out every hand planted row at a glance. They are several days ahead of machine planted. The extra cost to me is say $1.25 an acre that it costs to get them dropped. Mr. Carman's trench system is simply making a trench somewhat wider than I do and then filling it, after putting in seed and fertilizer. My plan is practically the same, as nearly as could well be in field culture, and came about in the way I have told you of. I had then never heard of the trench system. I was selling potatoes in large lots to grocers with a good class of customers and at a fancy price, and I must have the very finest potatoes. To be fine, they must grow down in the ground enough to not get injured by light. The plow would make a deep enough furrow, but other ways of marking would not. Therefore I went back to the plow, but to do it faster and better (reduce cost of production) ran two plows at once held by the sulky. I should have said that the scraper has a piece of band iron on front lower edge of plank, to prevent wear of wood. With the handles one can bear on or lift up. Quite a quantity of earth is constantly rolling and tumbling ahead of it. In the picture given the scraper stands upon two bushels boxes,

# CHAPTER XX.

## POTATOES—THE SEED.

I GREATLY dislike to plant anything but sound seed that has not sprouted at all. If one plants by hand the seed may have started to sprout a little, particularly if kept spread in the light, and these not be broken off. Machine planting will destroy them about all. The first sprout makes the strongest plant. The next is a provision of Nature to give a man a crop who doesn't take good care of the seed, but she has so arranged that he must pay the penalty of slackness. And still under favorable conditions, and with large or whole seed, there might not be any great difference, or possibly, no difference. Keep the potatoes warm all winter and sprout them two or three times and they would be almost worthless for seed or eating either. If they must be poorly kept I would not sprout until just before planting, if they grew a foot long. Then the second sprout or set of sprouts could grow, which is better than the third. Still the growing of long sprouts takes from the vitality of the tuber greatly. In some sections, early potatoes can hardly be kept from sprouting until planting time. In such a case I would buy them from the far North just before I wanted to plant. Or they may be kept in cold storage houses. I have friends in the East who keep them in cold storage in the city. If kept at a temperature just a little above freezing, they will not sprout. Some writers say keep at a temperature not colder than 40° or they will be injured for seed. All bosh! I have kept hundreds of bushels as low as 33° or 34° for months, and they were just prime and every eye grew. I have exposed them to a temperature below freezing for a short time to see the result. Potatoes cooled to 28° for a short time were all right. They do not freeze as quickly as water. It takes a degree of cold out doors below freezing considerably to seriously injure the vines. Keep your seed one or two degrees above freezing in your cellar and they will be all right. Better test your thermometer, however, with water to know it is right. Set some on potatoes in a shallow tin and when a scale of ice begins to form notice the thermometer. The seed should be covered, so that when the cellar is open to let in cold air, they may not be injured if it should get too cold before you noticed. For years I kept my seed in this way. It was much work. We went down cellar a good many times to open windows or shut them, and towards spring, say in April, it is pretty difficult to keep sprouts back.

By opening cold nights and shutting up days I have succeeded pretty well, though. A cold storage room with ice would be a far better plan, however, if a few neighbors would go into it together. The potatoes might stay in the cellar part of the winter, say until about March 1. Then but little ice would be required to keep them two months, and not a very expensive building.

Late years I have kept potatoes fully as well as in the cellar with less trouble by burying them. It may not be as safe, but I have never lost any yet. This is the way: Put in the cellar when dug until the temperature of earth gets down near freezing. It is cooler on bottom of cellar than when buried in September, or perhaps, October. About the first of November, perhaps, will be the proper time. We draw them out and pile on top of ground about three feet wide, as long as necessary and high as we can. One hundred bushels make a pile about thirty feet long. This should be made, of course, in a place where no water will stand, and a cool place on north slope will be best. Next I cover with straw, say, four inches thick after it is settled, putting a layer of forkfuls around base of pile, and then another above and lapping over the first, and so on up. This may be so carefully put on as to shed water. I never had any get wet, but do not know as it would hurt them, as the potatoes on the earth that are damp all winter keep perfectly. The object of a long, narrow heap instead of a large one is that they may cool quicker. After the straw is put on we cover with three or four inches of earth. Then, when this is frozen, and before it gets cold enough to run any risk of injury to potatoes, I put on another layer of straw in the same way and same thickness, and about eight or ten inches thick of earth, topping out well so as to shed water. I would like the pile well cooled through before this is put on, and then it should keep cold, or near freezing point, and very uniformly so, with two air spaces of straw. I put in no ventilators. Tried them, but they are not needed. If potatoes were stored from the field, they might be needed. From the cellar they are cool and dry. No use to let air in. Want to keep it out. When you hear farmers talking about covering too deep, because the winter proved an open one, ask them why not cover deep and have two air spaces, so as to keep warm air out and prevent sudden changes? I never had any covered too deep. I don't believe it can be done under the above conditions, the potatoes not fresh dug from the field. But we are not through. All right so far for the winter in this latitude. Along about first of March, when the ground over the pile is frozen solidly, we draw out a load of straw, or two of them, and cover all over and around two feet deep, and keep it frozen. You know how a mulch will keep frost in. It keeps the sun off, and the rain, mostly. The straw catches the rain and dries out mostly, perhaps, before another. Of course, the warmth from below will gradually take the frost out and warm up the pile, but not nearly as quickly as sun and rain and warmth from below together would. On the first of April I have found my pile frozen solidly, when there was no frost in the fields, nor had there been for some time. This helps about keeping pile cool very much. I have kept early potatoes in good shape until early in May nearly always. Neighbors and friends have tried it with success.

I have had good success getting my seed from Maine, and having it come just before planting time. It has arrived in perfect shape, but this year I got fourteen barrels, and for some reason they had sprouted a very little. Our own seed, kept in pit, was in better shape. But the change of seed, getting it from a distance and from the North, where the season is more favorable, will doubtless pay me well. Selection of seed will help greatly, but my experience is that, sooner or later, a variety runs down in yield or vitality, and we must either get fresh seed of the same kind from a better locality, or get a newer potato. Change of seed will help the old kind for a time, and then we *must* have something new. I do not believe in rushing into every new potato that comes along, but don't be too slow to change, or too set in the idea that you have as good as any one. I well remember one young friend whom I helped into the potato business, years ago, and who has made some money. He long contended that his Early Rose, from careful selection, were fully holding their own, or gaining. I always smiled at his positiveness, for I held the same idea once, but told him it was simply a matter of time when he would change his mind. Last fall he wrote me that the change had come. I could spend many pages on this point, but will only stop to give a single illustration from my farm last season. I have been growing the Monroe seedling largely for two or three years. It is a very fine medium late potato, and yielded all I could ask. A year ago I had a barrel of potatoes sent me to test, of a new variety not on the market then; in fact, they were not named. When the seed arrived I felt like kicking myself for promising to try them. They were in a miserable, poor condition. But I had to plant what I could cull out that would anyway answer. I planted five rows, sixty rods long, through a field of Monroes. Soon after they came up, a neighbor came along and asked what was the matter with these five rows. The stand was poor and growth feeble, noticeably so to every passer-by. Again I thought what a fool I had been, when I had plenty of good seed. But after a time the Monroes seemed to have done their best, and these five rows still kept on, and as true as you live, in a short time folks began to stop and ask what I had done to these five rows to make them so much better than the rest of field. When I dug them, I got just 6½ bushels more potatoes to the row from the new seedling, than from the old, or about 100 bushels more per acre, and the Monroe was quite new, too. But now what sized seed shall we plant? For nearly a quarter of a century I have planted good sized tubers, but not overgrown ones, cut to one-eye pieces. I have not done so blindly, but knowing from frequent experiments that it was best for me. I can make the most money that way. But certain conditions are absolutely required. The seed must be sound and unsprouted, the soil fertile and fine, and all tillage through the season perfect, and then I can grow just as many dollars per acre this way as anyone can from more seed—that is, all the soil is capable of producing. I do not say every reader can or will, but I can and do. Our experiment stations invariably decide against one-eye seed, but that makes no difference. It simply shows that with the conditions existing, it is not best for them, nor for others where like conditions exist. I settled this matter beyond all doubt for myself many years ago, but thinking there might be some change in conditions, I tried again some four years ago. A row was put in with two-eye pieces cut from our choicest seed. This was compassed with rows on each side, where one-eye seed was used. I confess I was a little nervous when Adam was picking up the product. Each row was picked by itself, and the potatoes left standing on the row in boxes, and they were so dug that a man couldn't pick up the wrong ones. I was digging with a machine, with my eye on the number of boxes. When Adam shouted out to me, "Just the same," I felt easier.

Now, this way of cutting is of no use whatever to a man with poor land, or clay land, or to a careless cultivator; but with the conditions and skill present it is all right. I do not care particularly about having my way, but it isn't pleasant to have some think I am such a fool that I do not know how much seed is needed on my farm, after raising potatoes so many years. Last year, Mr. Wm. Henry Maule, of Philadelphia, the well-known seedsman, sent me a barrel of his new Freeman potatoes, and asked me to make as much as I could of them for him, as they were selling for $3 a pound. Well, we cut them to one eye and then split the eyes and planted them thirty-two inches apart each way. Of course, this was not more than one-third enough seed to get a good yield per acre. But that was not what we were after. This spread them over 1¾ acres, and the yield was 305 bushels. Put on one-third the land, even these split eyes, with the extra care we gave them, would have yielded all the land was capable of producing. It is conditions and skill, friends. I think with a little more care I could grow 500 bushels from a barrel of seed. But cutting to one eye is as far as it is practical to carry this point in field culture. Thus far it pays us. We save seed to start with, and we get a more uniform size of tubers, and practically no small ones, almost. We sometimes plant seed worth $1 a bushel, or more. My seed from Maine cost this year nearly $4 a barrel; it has cost $5. If I can save $10 an acre to start on, it is quite a saving in cost of production, and pays for a little extra care.

There is a difference in varieties, though, about amount of seed required. The Early Ohio grows a small top and sets few tubers and needs more seed or the pieces very close together, in order to get a good yield per acre. Planted as I do New Queen, it would not yield half as much on my soil. The Freeman is of the snowflake family, and these are inclined to set too many tubers, even with one-eye cutting. The Early Rose, Beauty of Hebron, Monroe, etc., are all right, cut to one eye. The old Peachblow did better with more seed. Mr. Carman says he has a potato that will not start sprouts from all its eyes. Of course, this could not be cut to one eye. But these are exceptions. I was a good deal laughed at many years ago for cutting such small pieces, pitied because I did not know any better, etc., but now all my neighbors do the same on many acres, and so do many of our large growers the country over. Of course, the plant will not start as thriftily as with a whole tuber for seed, or a half one, but potatoes at $1 a bushel are pretty dear manure. Feed and care will make them end just as well. I never plant small ones. Like tends towards producing like. The best are none too good for seed. And yet with conditions right you might not for a single season notice any difference in yield between small seed and large. But I do not like to let down the bars towards deterioration. Plant culls every year and you will in time pay the penalty, sooner or later, according as you may care for them otherwise. All of these numerous points I settled for myself years ago by experiments, but I cannot stop to go into details too much, or the whole book would be about potatoes. I can change the shape of a potato by selection for a few years ; strange if little seed has no influence. If you want to do your best, go in the field and dig by hand, and select best tubers from best hills, from hills that without any apparent reason are much better than their neighbors. I did this for years, and it paid. With machine digging we cannot and do not do it, and varieties do not hold out as long.

It takes about eight bushels of large seed to plant an acre as we cut and plant. To do the cutting we use a very thin-bladed knife, such a one as is good for paring potatoes. If the blade is thick, grind it until it is little thicker than paper. A very thin knife blade goes through the potatoes easier. Wind some cloth around your finger so the back of the thin blade will not cut it. I do not like the curved knives. They are harder to use and pieces grow no better. We carefully tested the matter by planting an acre cut that way. To cut, take potato in left hand with the stem end down. Cut with a slanting cut beginning at the stem and turning tuber after cutting each one-eye piece off. You will soon learn to get the same amount of tuber in each piece, not have one small and another large. When you get to the seed end, as it is called, and have a piece of tuber left as large as your other one-eye pieces, there will be a number of eyes on it. Generally a cluster and perhaps a single eye off by itself. We clip off the cluster of eyes, just taking off a shaving, and throw it away; then you have a good one-eye piece. Otherwise we found that oftentimes more than one sprout would grow—two or three weak sprouts,—and a lot of small potatoes was the result. Of course, if only one sprout grew it would be just as well not clipped. Do not throw the whole end away. The seed end piece is better than the stem end piece. We sometimes reach up and cut two eyes on stem end piece (first piece cut) if heel eye seems very small. The plant from it is likely to be feeble in such a case.

We prefer to cut seed only as fast as we plant. It may come out all right cut ahead, but does not always. Rolling in plaster after cutting never paid us. It cannot be done when a planter is used, as it tends to gum up the concaves. It is safe enough, we find, to cut a day beforehand, storing the cut seed in bushel boxes in a cool place, covered from the air, or wind, and sun. A man without experience came to me once and said, "Now it is wet weather and I cannot fit my land and have plenty of help idle. Would you not advise that I cut my seed?" I told him that with all my experience I would not risk doing it. But he went back and cut some 200 bushels, and made a miserable failure, getting a stand that was not worth taking care of. He probably piled the cut seed up in bulk so it heated; but I do not know the particulars, only the general result.

As to varieties we must grow early or medium early ones, in order to get them off for wheat. The early ones require rather richer soil, I think, as they have less time to grow in. As to comparative yields of early and late ones, I think that for a term of ten years I can grow as many or more bushels of early as of late. Some years one will be ahead and some the other. It is not wise to change because the season is against you one year. The season may change and be against you again. I consider that a medium early potato, such as early Beauty of Hebron, planted as soon as ground is fit to work, gives me rather the best chance for a crop and profit in this locality. We are thus able to get them off earlier in the fall, during good weather, and they make most of their growth before the spring moisture gets low in the soil, usually, and get out of the way before there is much danger of blight and before our driest, hottest weather. But, although we grow early potatoes, we do not now sell them early, but store them in barn and sell after we get our wheat in and before winter. Once in a while there is a year when there is a chance to sell early, soon as ripe, but not often now, since so many potatoes are shipped in from the South. Years ago we sold right from the field largely and dug many before they were fully ripe. Now we can handle them cheaper later, when they get ripe, and the price is often higher. This year we have only the Freeman and New Queen planted. The Monroe seedling, although fine, is rather too late for us. We can, and have, got them off for wheat, but it makes more hurry than I like.

I like to plant, then, sound, well ripened (not blighted), unsprouted seed, of good, fair size, cut to one-eye (unless that may occasionally make too small a piece), and planted as fast as cut. But you must be the judges of what is best for you. Many have hastily caught on to my way of cutting without the other important points connected with it, and failed, of course, and then blamed me. Failure is easy if one point is wrong. When I was sick one spring my man planted some one-eye pieces in ground not half prepared, lumpy and coarse; failure, of course, resulted. He had the horses and tools to prepare the land, but lacked the level head that would see that everything was done just right. Unless you are sure seed and other conditions are and will be all right, you had better plant two or three-eye pieces, or halves, or even moderately small whole potatoes, according as the conditions are. Now, I have given you our way. Many differ from us. . I have an admirable little pamphlet before me written by my friend T. Greiner on "Money in Potatoes." He fully believes in using very much more seed than I do. Different varieties and different circumstances, doubtless, account for some of this difference of opinion. I would not be too certain I am right, but have tried to give reasons for the faith that is in me. Mr. Greiner is a high authority. He thinks also that potatoes cut to one eye will "run out" sooner than where whole seed is used.

# CHAPTER XXI.

## PLANTING AND CULTURE OF POTATOES.

WITH the ground ready, and the seed, we still must decide on depth and width of planting before we begin operations. I have planted on the top of the ground, and covered with a hoe, and I have planted to the very bottom of the furrow. The best depth, all things considered on my farm, is four inches. A very little deeper would be better than shallower. Any shallower than this, with our level culture, would give us some greened potatoes. Any deeper increases the cost of digging or the power required, if you dig with a machine, and does not show any increase in yield. Occasionally we find men advising deeper planting than this. I think they must have very light, sandy soils. I should think six inches deep might do on such land, and possibly in a dry year might show an increased yield. Our plan is sensible, at least. We put the seed about in the middle of the plowed ground. Plow eight or nine inches deep mostly, and plant about half as deep. This gives plenty of chance for tillage above the seed without disturbing it, and the roots start out from the young plants very naturally, with the food around and slightly below them. But always remember, this is for well-drained soil. You must not plant this deep on undrained, heavy soil. Even on my drained land, some seed rotted this wet year.

On my soil, such potatoes as Hebron, Rose, Freeman and New Queen, do best planted in drills about thirty-two inches apart. Three feet is a little wide for them. I can grow rather more bushels at thirty-two inches. And then they cover the ground better—more mulching. You will notice, I am very much in favor of keeping ground covered. If the drills are near enough together, so when the tops have about made their growth they cover the surface like a growth of heavy clover, it suits me exactly. I think there is a slight gain in fertility, and a greater gain in a dry year, from the shade lessening evaporation. After the tops about cover the ground, we cannot stir the surface, but must depend on the shade to mulch it. You can grow larger potatoes by putting drills further apart, in a favorable season. Giving the plants more room to feed in, increases the size of the tubers, usually, up to a certain point. But very large potatoes have not sold any better with me than medium ones of quite uniform size. A single eye, planted thirty-two inches each way from neighbors, will give much larger tubers than 13 x 32, as I plant for market;

but it will not give as many bushels per acre. This is where some of our stations have failed in their experiments with one-eye seed. They dropped an eye every three feet, say, each way, and then two-eye pieces the same, etc. This is not seed enough on my ground to give a maximum yield. Two or three-eye pieces would come out ahead the same as at the stations.

Such varieties as Monroe seedling, or Troy seedling, or any of the later and larger growing kinds, are better on my soil, planted three feet apart, that is, the drills that far, and the one-eye pieces thirteen inches in the drills. I say thirteen because eight pickers on the planter drop at that distance, and that is the numbers we use. When dropping by hand, we try and drop as nearly as we can to a foot apart, for early or late ones. Such varieties as I have named will usually make a good-sized tuber, large enough for most people, on my soil, planted as near together as stated. Of course, soils and market demands differ, and you must take into account the size of seed piece. I should not want to drop whole potatoes every thirteen inches in the drill. There would usually be more potatoes set than the soil could carry out. Whole potatoes would need be thirty-two or thirty-six inches apart. With one-eye and the first sprout, only a small number set, and on my soil, they usually grow to about the right size. Some very early varieties with light tops, may safely be planted nearer than thirty-two inches, particularly on rich garden soil. I have seen drills of Early Ohio twenty-eight inches apart that were all right. It makes rather close work in cultivating, however. Thirty-two-inch drills work very well. You see, I can lay down no fixed rule for all. I think I know what is best on my farm, and my experience may help you to decide for your farm and circumstances. Perhaps you may say large potatoes fill up the basket faster than small ones. Certainly, and when you have decided on about the right distance apart, then make them grow just as large as you can. I wish I could shove them up to a pound apiece by extra good culture. From foregoing remarks, I would not have you think I do not want good, large potatoes; but simply that I don't want them at the expense of yield per acre in dollars.

But now I believe we left the ground all rolled ready for planting, and all these numerous little questions of seed and seeding having been settled, we are ready to go on with the culture of the crop. If possible, I prefer to plant with the ground rather dry, to avoid unnecessary packing. I always hope for a dry spring and wet ending of season. We need no rain at first. Tillage will give moisture enough until the crop is up and well started, and we can keep it clean so easy then, and the soil does not get settled and hard down where you cannot cultivate. But now, while I prefer to plant with soil rather dry, I want to put the fresh cut pieces of potato into a freshly opened furrow—a damp one, not one that has dried out. The planter does this every time. If planting cut potatoes by hand, I would not mark out much ahead of droppers, and I would cover pretty close to them, too. In fact, when we planted largely by hand, we had one team on marker and one on coverer, and I would plow out a few rows and then cover a few. Thus the potatoes were covered in the fresh, moist soil and were not exposed to the sun much. In my experiments, I have found that drying the seed was an injury. I keep the boxes of cut seed covered. You may wonder whether I would take the cold seed right from heap and plant at once in the cool earth without any warming up or exposure to light. Yes, if I could. They might not start so quickly—would not bring quite so early a crop, but it is the best practical field culture. You may start sprouts in the light and drop by hand in a small way all right to hasten their growth. But you cannot increase the yield, all other conditions being equal. Are you afraid you will plant some eyes that will not grow, putting them in before they start? Well, you may leave them out long enough, if they haven't started a little in the pit, to show the least bit of a point starting at the eyes. But I never had any trouble with such seed as I plant—good, sound and well ripened. Practically every eye grows. When planted by hand, I have had fields in which you would have to walk miles to find one missing hill. As soon as we are through planting, the working of the ground is continued. Where put in with planter there is a little ridge over each drill, so one can see the rows as well as though they were up, and we usually cultivate between them thoroughly, and deeply as a horse can stand, and then harrow with a smoothing harrow, keeping horses between the rows so as to not tramp on the soil that we cannot cultivate up. The Thomas harrow that we use has 72 ⅝-inch round steel teeth slanting backwards, and takes a sweep of about ten feet. But we harrow only three rows at once, the row between the horses and one each side, lapping the rest of width. If it is a *very* dry time, and likely to remain so, we roll after this harrowing unless ground is so fine that we are sure seed will not dry out. I prefer not to roll unless necessary, as if it comes on wet afterwards the soil will be better loose. I sometimes roll the clay spots only where the soil is not as fine. I have rolled and harrowed them alternately two or three times to get them fine enough to be safe when it was very dry. In a few days, five or six, say, I harrow again lengthwise, with horses between rows. Should it rain, I harrow again when just dry enough, letting no crust form. If I harrowed early in the week and by Friday it looked as though it would rain again soon and is hot and a good time to kill weeds, I harrow again; as soon as it is. When it sets in to rain it may keep wet until weeds get well started. The harrowing is fast work, two acres an hour, and we must keep entirely ahead of weeds for best results. Never fear of overdoing harrowing when ground is dry. The last harrowing is crosswise to level down ridges more perfectly and make a sure ending of all weeds. We generally harrow three times before crop comes up. But now one important point: You must not get caught and have your potatoes come up in the ridges unleveled, and you must not harrow ground away from plants to level after they have got up out of the ridge that you have failed to level. You may put some soil over a young plant and do no harm. We have covered them when just coming up with an inch or two of soil to protect from frost. This is all right enough, but do not take earth away from a plant after it has got up in a ridge. It will do harm. If you have got caught you had better let them go; but try and not get caught. They will not do as well and you cannot throw a little earth in under plants late in season as well to check last growth of weeds. The potatoes come up through a nice, level, mellow surface, and it is all clean and entirely free from weed growth. In any ordinary season this is literally true. This is perfect culture and cheap. Doing so much work after planting you see why we do not need to do more before. After planting, tillage keeps weeds down at same time, and the surface always open to air. The last harrowing is just before potatoes come up. Here and there one may be in sight. As soon as we can follow the rows, we begin using Breed's weeder with one horse. This simply harrows two rows at once, with horse and man walking between them. It is lighter and does finer work after crop is up than a Thomas. If the ground gets packed by rain, we cultivate first and follow with weeder, which, on clean, mellow land, will then stir the soil in the drills and around the plants, and help keep weeds from starting. With conditions right, hand hoeing is entirely unnecessary, as this tool will do the business at the rate of twelve or fourteen acres a day. It should be used when the soil is in just the right condition of moisture. Too wet it will clog; too dry it will not take hold. It requires skillful work just in time, but this saves lots of hard work later.

To do this first cultivating the Iron Age cultivator and harrow with fourteen teeth (a one-horse tool) is by all odds the best thing I have yet seen. I have for years used a Planet Jr., with five narrow 1¼-inch teeth. This does pretty well; but the fourteen little bits of teeth are as much better as the Planet with its narrow teeth was better than the first cultivator I bought, which had three wide teeth. The teeth of the Iron Age are sharpened as cultivator teeth, very narrow on one end, and as harrow teeth on the other. I am using it to-day with ten cultivator teeth on and two harrow teeth on each outside. Thus used it will not throw a particle of earth, and one can go at full speed in small plants, if rows are of equal distance apart. As the potatoes get larger we can set the outside harrow teeth higher, so as to not go as deep next the row. You must see that fourteen teeth will pulverize more than five. I can do much finer, nicer work faster than with any other cultivator I ever saw, and it holds easier. It is practically a harrow, the teeth are so narrow, but it will dig. I feared it would clog, but it does not on our land. We have long wanted something to stir the soil thoroughly, and not throw a particle, just leave it level; in fact, I made a cheap affair of this kind for my own use, as I could not find anything in market that suited me. I have to thank my friend E. M. Titus, of Villa Ridge, Ill., for taking pains to write me and tell me of this tool that he happened to know of. He had read in my strawberry book that I badly wanted something of the kind. To do the first cultivating before potatoes were up, I would prefer a heavier tool to tear up more and deeper, such as the Planet Jr.

We cultivate at least once a week, and more often twice, and always as soon as it is dry enough after a shower, no matter if we had just finished before the rain. This to check evaporation of moisture, of course, more than to check weed growth. This subject is fully treated in chapter on Tillage. Weeder is used in the same way until plants get too large—push over too much. When potatoes get nearly ready to fall down we put one side shovel on Planet Jr. horse hoe, the right one, cultivator teeth, 1¼-inch wide on three centre standards, and take off the left side standard out of the way. With this go twice in a row and throw about an inch of soil in under the plants from each side. This should meet in the centre and check weeds from starting and raises soil a little around the hills to prevent any tubers working out where they will be injured by light. All these operations, well carried out, should give a crop practically free from weeds, and at slight expense above what was needed in the way of tillage to check evaporation, etc. Some years a few weeds may escape these tools. These we pull by hand, if wet, as soon as they show above potato tops, or cut off if too dry to pull. We do not want them to go to seed. Years ago I have hoed a field two or three times by hand and not got it as clean as we usually keep one now without any hoeing, except at the ends where we turn around. Of course these must be fixed up a little by hand. Tools used in time do the work far cheaper, save me many dollars in the cost of production, and save the plant food that weeds would eat up. Did you ever think of this? There is only so much available plant food in your field this year; just so many pounds and no more. If you let the weeds get *any*, there will be just that much less for the crop. With old ways of letting weeds start and grow considerably, and then cultivating and hoeing them off, we lost plant food every year. It would go back to the soil, but not into our pockets that year.

But I have said nothing about the depth of any of this culture, except the first cultivation, and there is no more important point to consider. The soil was made for roots to grow in, wasn't it? They get their food from contact with the particles of soil. If three inches of soil for them to feed in is good, are not six inches better? Certainly. But you say we must cultivate some of the soil to keep weeds down and check evaporation. Yes; but does not common sense teach us that we should not go any deeper than what was absolutely necessary to accomplish this end, and so let the roots have all the feeding ground possible? You cannot fail to see this. Some readers may not have thought that roots grow all through the soil between the rows, the same as under the hills. They do. By the time the potatoes are four inches high, they may meet between the rows. They spread out very rapidly, and soon occupy all the soil. Don't take my word for it, but wash out a plant or two carefully and see. Now, I consider it foolish to tear off these roots, or part of them, after they are well started, and put the plant to the expense of growing them over again. This the plant can do, of course, and in wet weather may do it quite rapidly and without great injury; but I had rather it gave its whole energy to growing tubers, or a good, strong top that always goes with a good yield on my farm. I have seen serious injury done by tearing off the roots when tops were half grown and dry weather followed. I have seen a young man "ride" a one-horse cultivator, sinking the rear teeth, although there was a wheel on in front, rightly set, some four or five inches, and doing damage to the amount of $10 or $20 an acre. The growth almost came to a standstill for some time, while potatoes cultivated not more than half as deep, right side by side, and no better before, grew right on steadily. Check the growth of a crop, and you will run short at harvest. Slight root pruning will do in very wet growing weather, and when plants are first starting. The first cultivation after the plants are up may usually be deep with safety, as well as one before they come up. But after that I *never* allow any cultivation more than 1½ to 2 inches deep. And I *know* that it isn't. I explain the matter to a man and then tell him that he must know that he isn't going any deeper, and I am around to see that he doesn't forget. I have been out and looked at what my man was doing twice in the last hour, while writing this. The weeder will not be likely to go too deep. Generally one has to bear on to make it go deep enough. I have tied on half a bushel of wheat in a bag to make it go deep enough. The smoothing harrow if not loaded does not go too deep before potatoes are up. It may break some roots from the little plants just before they come up, but not enough to do any harm, or at any rate, it does good enough to more than make up the damage several times over. I think you cannot help but see that this shallow culture is as my friend Carman, of the *Rural*, puts it—sensible culture. Will you not, as one friend wrote me he had done, "join the Society for Prevention of Cruelty to Roots?" To be sure, large crops have been grown with severe root pruning. If the land was rich enough, the crop might stand it, and do fairly well.

I have sometimes wondered, that crops could do so well in spite of the most outrageous treatment they sometimes get. The damage to a crop from injured roots, however, is largely owing to the kind of weather that follows, and the fertility of soil. The better the soil, and more favorable the season, the more they are able to repair damages.

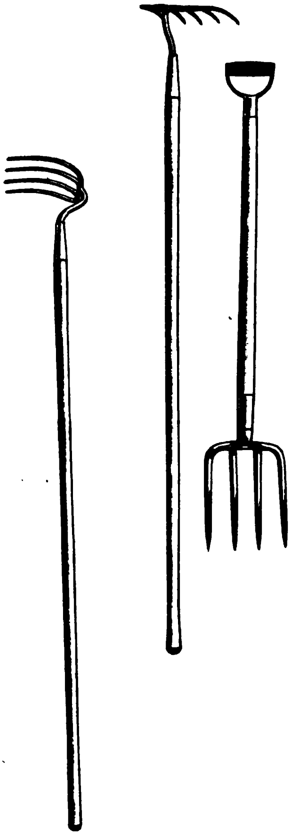
Now, how nicely this lays the foundation for considering the question of level culture as against hilling up. How can one hill up or use shovel plow without injuring the roots? Piling some fresh earth under and around the plants will do no harm. It makes a nice mulch. But you take it off from roots between rows, or even tear them off to get the earth. This is where the damage comes in. It is not "sensible" culture. Again, you cannot have hills without valleys. With a field well ridged up, if it is not perfectly level, what a nice system of little ditches you have got to carry the water off without having it soak down during a hard summer shower! Or, perhaps, it runs off of hills and collects in depressions in your potato field, making the dry dryer, and the wet too wet. Would it not do much more good to soak straight down, as a rule? Will not level culture catch a rain and hold it better? Also, when rain water flows off on the surface it takes quite a little ammonia with it, fertilizer brought from the air, that went up from someone's manure heaps, perhaps. If the water soaks down your crop gets this. It is worth catching. In some sections the habit of hilling up might have come from raising potatoes on a soil that was not well drained. It had better be continued on such land, planting rather shallow. But it is poor farming, and one never can do his best in this way. Perhaps the use of the plow largely as a cultivator at first had something to do with it, and the ease with which earth could be thrown over weeds. I read once in an old English book that there was a scientific reason for hilling; that more potatoes would set where earth was banked up against the plants; that there would be two stories of setting, so to speak. Still, careful experiments have shown that deep planting and level culture will bring the larger crop, particularly in a dry year. If you want more potatoes to set, plant more seed. Nearly always too many set as it is. By level culture one not only saves rain water from running off, but he can make use of the earth mulch to check evaporation far better. Less surface is exposed to the air and more of it can be stirred. After a ridge is once formed you cannot stir the sides and top much, and evaporation must go on faster from them than from a level stirred surface. The objections urged against this practice are that the potatoes are harder to dig and are greened by exposure to sun more. As one writer put it lately, "It is easier to level a mound than excavate a hole." Well this may be true, but he is making too strong a case against level culture. But, first, I want to say that in practice the tubers do not grow out and get greened in level culture such as we give. I have grown thousands and thousands of bushels in this way for many years, and practically we have no green ones. This is a fact that I know, and knocks a car load of theory out of sight. Let me explain just what is meant by level culture. It is not absolutely level with us. Earth will work towards the drills in cultivating so many times, and we throw in an inch or so towards the last, usually. At digging time the ridges may be raised a couple of inches. Now, if they were planted in hills three feet apart, there would be more tubers in a place and the ground would be cracked and raised more and injury might result with our method of culture. (I call it ours; we are not alone in it. Hundreds cultivate the same way.) With one-eye pieces every foot there is no trouble this way, fewer potatoes being in a place. You ridge up potatoes high and the tendency is for them to set towards the surface and the ends work out of side of ridge, unless it is wide, and, perhaps, the top cracks and lets tubers get injured, unless earth is hoed up over them. A man finding it thus with hills can hardly believe that there will be less trouble with good, level culture. But I have grown them both ways, and know what I am writing about. It is some like harrowing potatoes or corn. One who had never seen it done would be certain it would work great injury. I was myself once. But the fact is it doesn't under proper management. It is hard for us to get over old notions.

Now, a narrow high ridge, such as the tubers would stick out of some, might be easier digging than our low ones. A broad high hill I do not think would be. There is about the same amount of earth to be moved in either case, and with our culture I do not think there is enough of a hole to "excavate" to make any difference. I have hired many acres dug by hand, planted in both ways, and I have hired men to dig in level culture who had been digging hills, and I am unable to see any increase in cost of digging from level culture. But most growers will soon dig with a machine anyway, when it does not make any practical difference, any more than it does whether they are in hills or drills. You must bear in mind that I have no possible interest in pushing these points; in fact, it is for my disadvantage, slightly, for I shall help some to grow larger crops and diminish price I can obtain, perhaps, by increasing supply. I have found ways that were better than the common ones and changed to them, and it is entirely for your good that I tell of it. I might write and not tell the best I know; but I never have done so yet. Another common notion is, that we must stop all cultivation at blossoming time. Can you not see that was right once, when the work was done with plow, or shovel plow, or even deep running cultivators? Observing men noticed that later working injured the crop. Even blossoming time was too late for deep work. Noticing it they quit working then and there, and it was handed down from father to son as the proper thing to do. There was another way out of the difficulty, but no one thought it out. It was to abandon deep tillage, use light implements that would not go more than two inches deep and then continue right on working crop as long as you wish, or can get through. Little by little this was worked out, and tools suitable to the work came with the demand, and now one may cultivate as long as he can and do no harm, and some years do a great deal of good. In a dry year, like 1881, we have had the cultivators running in the field at the same time we were digging the first early ones for market. They were going very shallow and narrow, of course, making a slight earth mulch between the rows, to help save moisture. It was so dry the tops did not grow large enough to cover the ground or to fall down and prevent cultivation. If they had, the cultivation would not have been needed so late. As the season advances, and the tops shade more, we narrow up as well as run shallower with our cultivators. The Iron Age harrow, running an inch deep with its fourteen harrow teeth, would be sufficient at the last. We want to devote all the soil possible to the roots.

# CHAPTER XXII.

## HARVESTING THE POTATO CROP.

WHEN I began farming, the potato hook was in quite common use as a tool to dig with. This is much like a hoe, only there are four or five tines in the place of blade. It is a sort of pronged hoe, excellent for stirring the soil by hand around potatoes or garden stuff or strawberry plants or in the flower beds. We have two and they are used a good deal, and are way ahead of the hoe to stir soil to keep weeds down and prevent a crust forming. These hooks are better to dig potatoes with than a hoe, as much better as they are to use in the garden. Many could hardly believe it, but I saw last year in Ohio five or six men digging potatoes in a large field of 30 acres or more with hooks. It seemed as though I had gone back to my younger days, as I have not seen such a sight where I live for twenty years. The fork took the place of hook here long ago. This is not a manure fork, as some think who have not seen them and have written to me about them. It is a regular potato fork made on purpose for digging, with four or five stronger and wider tines than a manure fork has. They are found at all hardware stores, or country stores here. One can dig very much faster than with a hook. If conditions are right, in many cases it will be found now that to dig with a fork in the hands of a strong man who knows how to use it is the best way. I have had a good many thousand bushels dug that way.



Potato Hooks and Fork.

A man who was used to it would dig, in a reasonably clean, mellow field, one-half an acre a day or more. A real expert of much experience can dig readily on my farm five-eighths of an acre. I have had it done time and again. Of course, he did no picking up, but just threw out the tubers. The best digger I ever had would dig 200 bushels a day, nine hours, right through the week, where the average yield was about 300 bushels per acre. It took two common men to pick up after him and pile them. He had to quit digging at 5 P. M., to let the pickers catch up and get out straw to cover the heaps. We had nearly 7,000 bushels that season grown on about 24 acres, and this one man dug them all and, I think, got through the 15th of October. We were hauling to market with two teams most of the time, but there were some 2,000 bushels in the field in piles when he got through digging that he had gained on us. He was the best digger I ever saw—a real expert, strong, willing and skillful. One would have to almost keep steadily walking to follow him as he tossed out the potatoes with a fork. I hardly ever knew him to "stick" one, or leave one not thrown out. He would place the fork just at the right distance back of the hill to not hit any tubers, and still not far enough to move an unnecessary amount of soil, and then with a half lift and half flirt, the potatoes were spread on the surface and the fork was moving on to the next hill. He seldom used his foot on the fork and nearly always a single stab brought out all the tubers. But they were one-eye hills, with a few good sized potatoes right in a small cluster, as we grow no spreading varieties. And the soil was reasonably moist all the time. In very dry ground, where one had to put the foot on the fork every time to force it in, he could not get along as fast. Again, there were practically no weeds in the field. I have often seen men mow a potato field in the fall and rake the weeds and grass and draw them off. Such farmers would not be able to credit the above statements, because digging in such a sod is very much slower, harder work. When we do one thing right it helps us to do something else better, often. Clean culture increases the yield and makes far easier digging. Now, do not think any common man without experience can or will dig as fast as I have spoken of. Good, willing men might not be able to half do it at first, and do good work, but I have had no trouble in teaching any strong young man who wanted to learn, so he could dig half an acre a day after two or three years' experience. I know how to do it, but never saw the day when I was able to do it all day myself. My back is too weak. Nor could I ever pick up very many potatoes. And still I have made money at the business. I have been able to direct the labor of other men to advantage and select some of the work that I could stand it to do myself.

Hiring a real expert, as I did for years, a digging machine was not much needed. Again, in those days the teams were constantly on the road drawing twelve miles to market. If I dug with them it would hinder this work. Not long ago some large grower, writing in papers, said he found it about as well to have his crop dug by hand, and keep his teams at work, as to use a digger. I could easily see how this might be wise, as I have been in just about the same situation. But now machinery has come around, good diggers are not as plenty. They seem to have gone where the cradlers did soon after the binders came around—to seek a softer job. Also, we do not sell until after the wheat is in now. There is little or no demand right from the field in August and September, such as we used to have. Now, if I hired men to dig, they would be of a class likely that would not dig more than half as much as a real old-fashioned expert, and, while they were doing it, my horses would be standing in the barn doing nothing. Under these circumstances, a digger may be a great advantage. The first digger I tried was of the cheap, plow digger type. We carefully tried it side by side with hand digging, and found we could not afford to use it at all. It did not take all the potatoes out clean. Many were left covered or partly so. It was a job to pick up after it. Then we were told we could harrow the ground over, and pick up the rest. Then I guess you might cultivate it and pick up some more, and then harrow it and find another crop, and then you would plow up some the next spring—get them all—but too much strung out for a man who had been in the habit of taking them out all clean as he went at one time. It is but fair to say, however, that with high hills these cheap diggers would work better than with our nearly level culture. The next higher grade of diggers did some better. The Planet Jr. digger is a passably good, cheap one. I have a Hallock here to try, and should judge it a good tool of its class, but haven't used it yet. I doubt whether any one grower has ever tried as many diggers as the writer. It has been a real task. The first high-priced digger was the Aspinwall. Price, $125. The manufacturer at that time (Mr. Gill), came here in person, and worked hard all day. At last he owned that that was the best he could do, pointing to last rows dug. We dug them over by hand, and found enough left in the ground to pay for hand digging, and we could pick up much faster after the fork. So I took the digger back to depot. Years afterwards, Mr. Aspinwall came here with an improved digger that did better. The draft was light, and its only fault was not leaving all tubers out clean on top. Whether they have been able to do this yet or not, I do not know. The Triumph digger from New York State stands about like the Aspinwall—not quite perfect, but would do fine work under certain conditions. Some eight years ago I tried the first elevator digger, called the McCallum. It was poorly made, but I soon discovered that the principle was correct, and that when it did go it was the nearest perfect for our mode of culture of any digger yet seen.

With a little care and skill I managed to dig clean and pretty well with this tool, where there were no small stones. These would bother a good deal. The potatoes were laid out on top of ground in nice shape for picking up.

After a time it was said the patent on the McCallum expired through some default—not making a second payment on a patent taken out in Canada, I think, which annulled the patent in this country. Then Hoover and Prout went to improving on the machine, and sent their make out under the name of the Hoover digger. After struggling along some years with a McCallum, I procured a Hoover. This is now made so stones do not bother much, and under reasonable conditions, with four horses on, or perhaps three, one can dig well and fast. There is no better digger on earth to-day that I know of. Of course, it is somewhat complicated, and in blundering hands it would soon come to grief, like many other good tools we have. But if one keeps it in good order, well oiled, and is careful, the wear and tear need be very slight on reasonably clean, mellow land. I have dug an acre in two hours, with long rows and conditions all right. This is nearly ten times as fast as expert hand digging, and twenty times what common hands would do. Late years I have done all my digging myself, without paying out anything, and put my men to picking up. When we are in a hurry to get them out for wheat, as we always are, the digger is a great help, as we can rush the job as we never could get the help to do by hand. But now let me tell you just what you may expect of the digger. It will not do good work going along a side hill. It will do all right going up hill always, and straight down hill if the grade is moderate. On all level and gently rolling land it will do nicely. I would not buy one to use in a very stony or gravelly field. It will go through such spots, but the wear and tear will likely be too heavy. On a clean, mellow, level field, it will do your eyes good to see how nicely it will transfer the tubers to the surface. With the varieties that grow compactly in the hill, which we raise always, it will get every one except small ones, provided you put on power enough to run deep enough, and your rows are straight, and you keep the digger under them. This is not hard to do. Very few are cut and these are not injured as much as those stuck by hand digging. Most varieties will not bruise any to hurt when fully ripe. I found a variety once that would bruise and crack from contact with the iron of digger. They were exceedingly tender. I have never dug any green potatoes with a digger. I should expect them to bruise some. I have never used the weed and vine turner. Took it off before starting digger. We do not mean to raise weeds, and the dead vines do not bother much, going right over with the potatoes. I use two teams on digger, one ahead of the other, as I want to take one off to use in drawing in. Three good horses abreast would be power enough.

I have dug with two when soil was mellow and not much to do; But one can hardly run deep enough for best results with two ordinary horses for motive power. Four go right along easily, and the machine is made to stand the strain. On a hard, dry clay soil the digger would not do well, nor would one digging by hand. When it is excessively wet, machine digging is bothersome, and may be stopped entirely. You see the earth cannot get through the grates, so as to be separated from the tubers. I seldom have any trouble at the season of year I dig. The digger works like this: A broad steel point runs under row, taking earth, potatoes, vines and all, up onto an endless chain that runs over a slanting grate. The grate has a motion, up and down, and the earth works through this, and the chain carries the tubers back to the rear where they are shaken entirely clean and left on the surface in a narrow row, by a shaking grate that inclines downwards. Stones and clods will go through with the tubers, and hence they never can be put into boxes or sacks practically. On very clean, sandy soil, this may be done after a fashion. I have been a long distance to see machines that tried to do this, but must advise you to give them a wide berth at present. And still there is no telling what may be done in this line in the future. I would not dare say potatoes will never be picked up by machinery practically.

I always dig and store as soon as they are entirely ripe, so they will not hang to roots, and the skin will not slip; in other words, as soon as we can use a digger without injuring them. We want to get them off so we can fit the wheat ground, but they are best dug then, anyway. Why leave them in the hot soil exposed, after the tops die down, to injury from light, perhaps, and to the ravages of wireworms, white grubs, etc.? I have never had much trouble with these pests, but am told that where present they keep to work on the potatoes, and the scab is said to increase. A market gardener from Cincinnati told me he always had to dig his Early Ohio for seed just before they were ripe, or they would be a mass of scabs in a few weeks' time. I merely give this without vouching for it as to whether it is practicable to dig soon enough to gain much. A cool cellar is a better place for the potatoes after they are ripe, or a basement stable, or even a pile on the ground well covered with straw. We usually dig the last of August and first few days in September. No matter how hot it may be, we draw right into the barn basement and store about three feet deep all over. We have put in thousands of bushels in this way, for years, and had no trouble. The basement is made entirely dark, of course, by putting building paper over the windows. The potatoes are stored right on the earth. When short of room I have put them four feet deep, and have had a pile 11 feet by 60 together. This is about as good a place to store in until cold weather as a cellar, and handier to get potatoes out. They can be kept well in piles out doors, but it is more work and not as handy to load for market afterwards. We always sell before winter, usually in October. As we are situated this is wisest. We are too far from market to handle them in winter or spring. In the long run we get the most out of them to sell when the roads are good, in the fall, and save further shrinkage and risk and interest. Once in a while we might make by holding, but sometimes we would lose practically the entire crop. I have seen potatoes so low in the spring that they would not pay for marketing, when the fall before they would sell so as to pay cost of production and 50 per cent. profit. Last week (June) car loads of old potatoes were offered in Cleveland to any one who would pay the freight, without finding buyers. This is slaughter, and I will never take any such risk. If you have no room in doors and want to dig and store potatoes outside, put about fifty bushels in a round heap and cover with straw. Begin by placing a layer of forkfuls around base of pile, then another layer a little higher up and lapping down over first, and so on up, capping well with straw on top. Put a little earth on top to hold last forkful. I have covered many a pile in this way so it shed rain perfectly. You must either use a good deal of straw or put on a little earth to keep the light out. Three inches of earth will do, and there should be none on the top except a shovelful to hold the last forkful of straw. Light will soon injure the quality of potatoes. Be sure you do not leave potatoes covered with straw only after frosty nights begin. Straw is not much protection from cold unless there is some earth over it. I had some potatoes frozen once the 16th of October, through a good coat of straw and vines. Farmers often complain of its being such a job to put potatoes in the cellar and take them out again. Well, that depends. In my old house cellar it was. In my new one, eight feet deep, and an easy stairway to walk out with a basket on my shoulder and no danger of hitting top of door, I do not mind the job very much. One fall we stored a car load or two in the cellar of house (we have room there for 2,000 bushels on a pinch) and as many more in piles on a dry hill covered with straw and a little earth. I sold them late in the fall (first good offer) to one man in Akron, twelve miles away. I had paid off my man and had no help, and loaded and drew all those potatoes alone. I found those cold mornings that it was far easier and pleasanter to shovel up and carry out a load from my cellar, than to pick up one from the heap and put into wagon standing close by. Now we have plenty of barn room ; this is better than storing in the cellar, as they do not have to be brought up stairs to load them. Sooner than store large quantities in a cellar temporarily, I would put up a building on purpose to put them in with a ground floor, ten or twelve feet high would answer, and I would board up with matched flooring outside and in. I have just such a building, only it is under my main barn, and opens at one end into my covered yard, which makes it very handy to load and unload under cover. Where one is situated so as to sell right from field as he digs, it is quite a saving in handling, as well as in shrinkage. We cannot do this and get our wheat in in time. But we never take out of the barn as many bushels as we put in. Potatoes will never again weigh or measure as many bushels as just before they are dead ripe. If not dug until some time after, and stored where it is cool, they will not shrink any large amount for a month or two. The heaviest shrinkage comes just as they are ripening. Last fall we put in 300 measured bushels by themselves just as early as it would do to dig and store them. They were not yet dead ripe and dry and tough. We took out towards winter just 284¾ bushels. This was mostly shrinkage, although there were a few poor ones thrown out. Sold from the field we would have saved five bushels of shrinkage to the hundred. Sell as early as you can at same price. Late years we can hardly ever sell by the car load until later than we dig, and the price is apt to be better in October than August.

But here I am getting them all stored before picking up! One more switch off about bushel boxes and then we will go into the field. I had not been growing potatoes many years and figuring to reduce the cost of production, before it became clear to me that it was costing too much to handle the crop. We dug and picked up in baskets and carried them to heaps to cover, which made lots of tramping and hard work carrying. Or we dug and picked up in baskets and emptied into a wagon drawn along by a team. This was costly, if one had other work for team to do. Then we went to cellar with the wagon and shoveled them up into baskets and emptied them. This took a good deal of time. At last I was driven to study up a bushel box to handle them in. We have used them many years. We can handle the crop for about half the cost. They are a good thing for potatoes or apples. Learning from me, thousands of others are now using them. We made them just long enough so two would set end to end across our three-foot wagon box. They are 13 x 13 x 16 inches inside, with hand holes in the ends. The ends are five-eighths inch thick and sides and bottoms, three-eighths. They should be made of light wood, so as to not weigh any more than is necessary. They are iron bound on the corners and hold a good bushel of potatoes without being a bit more than an easy level full. Thus they can be stood one on top of another and not bruise the top potatoes. Strictly speaking, this figures a little more than a bushel, but practically it comes just about right, as we want to fill rather slack rather than the least bit rounding. If you do round them up, or place them nice on top, you will get in more than a bushel, usually. The first hundred I got made cost me $30, but they are made better now by machinery, and sold by A. I. Root, of

Medina, Ohio, for about $16.50 a hundred, in the flat, ready for shipping, and all ready to nail together. You cannot make yourself such a strong, nice light box as these machine-made. Some of my neighbors found they made a great mistake trying. Many thousands of these have been made and sold the country over as "Terry's potato boxes," but I have no interest whatever in them, only that I first brought them into use, and hope they may help thousands of others as much as they have us. When we used to draw to market early in the season we took them in these boxes on spring wagon and left boxes with dealer until they were sold. We made quite a nice thing of this. They readily brought more money. Dug, say, in the afternoon and covered from the sun by a piece of board just large enough for a cover, as fast as a box was filled, and carefully put in as dug, as carefully as eggs would be handled, and then loaded on a spring wagon in the early morning with a canvas cover over it to keep the sun off, they rode twelve miles without a bruise. Before noon they were in the city and the grocer set the boxes right into his light spring wagon and they whirled around, a bushel in a place, to his customers, who got them as nice and fresh as from their own garden. There was no handling and bruising from our field to the consumer's cellar. Here was good, big, honest measure, of choice varieties of potatoes, properly grown and got to the consumer in prime condition. Do you wonder I had it all my own way most? I very seldom caught up to orders after once starting. A little judicious advertising, and pushing, with good goods to back it, soon made "Terry's potatoes" a household name in many families, and dull markets and hard times were over for me, but not hard work. I have been to Akron twice in a day (forty-eight miles on the road) to keep up with the demand. But this was a good while ago.

We use the boxes in the field now about as follows: At night I generally leave a load scattered down through the field by the side of where I will dig in the morning. Always leave them, when on the ground over night, bottom side up. The bottoms will not swell and injure them then. In the morning I hitch onto digger with two teams and dig, say, six rows, digging every other row always. Then I stop, let one team stand with the digger and take the other and go to barn and bring out a load of empty boxes in wagon with side boards on so it will hold fifty or so. This wagon I will tell about and show picture of it and of the boxes in Chapter XXXI. I drive along down through field by the side of potatoes and drop boxes off as I go. I manage to get to the lower end just about as my men (who began picking when I began digging) do, and turning around pick up a load of potatoes as I go back, my men following wagon and setting in boxes as I pile them up, two, three or even four high. Then we go to barn and unload. Next, take team off wagon and go to digging again, while men pick up another load, etc., etc. Steady work like this puts a good many potatoes into the barn in a day. At the barn I hand them off as fast as two men can carry them a short distance and empty. When all are emptied it takes but a minute or two to put the boxes on the big wagon. Two men cannot unload to advantage. Three of us can slap off fifty bushels in almost no time. There is no waiting one for another. I have to stir to keep the two men going and they have no time to waste if they keep up to me. There is much in system like this. I guess I will not tell you how many bushels we have sometimes dug and put in the barn in a day, as not one in ten who handles potatoes in the old way would believe me. If drawing to the cellar I use the boxes just the same. If piling out doors I would, too, thus making the piles altogether in a dry corner somewhere, not scattering them all about a field where the potatoes were dug. Those piles I told you about loading from alone were built in this way, off from the field, so I could put that into wheat. It would surprise you to see how quickly I can dump a load of fifty bushels into a heap from the back end of a wagon. If loading on the cars near by, from the field, I would do the same way, going with two loads at once and an extra man to help unload besides the drivers. To load a car from the barn or cellar, however, I use two-bushel burlap sacks, putting a bushel in a sack. Two men will toss them on the wagon then as fast as I can load them, and they are easily unloaded, and less dead weight to draw than with boxes. Sacks are altogether the best for car loading. One man can shovel up 100 bushels into sacks while two of us have gone to depot with two loads. If the loads are weighed at the depot, as usual, it does not matter whether just a bushel is got in or not. We do not tie the sacks, of course; just drop them with a little twist of the top. I would just like to race with you using these sacks, while you loaded a car by shoveling into baskets and emptying at each end. You would learn how we reduce the cost of production in that line.

But now I *must* get to picking up. Do you know why I have kept putting it off? Because I don't like to do it. I had rather ride the digger or load potatoes or anything else; but it must be done. But there is much chance for picking up to advantage as well as loading a car. I dig every other row for a ways and then go back and dig the alternate rows that are left. Two men should always pick up together, each taking a row and lifting the box along between them on the undug row or the picked up row. They then have just one straight thing to do, and will pick more in a day than where all the rows are dug and they pick all about them, and often have potatoes in the way when they want to set a box down. When picked, they leave the horses right on this straight row. There is very little carrying. When I load up I drive so the row of filled boxes are between the horses and under the wagon. As the team moves slowly along they are set in without much work. If two rows of potatoes will not make a load (one row of boxes), why drive between two rows of boxes and load them both at once. When potatoes are cheap, we sort right on the ground, only picking up what will sell, and leaving the small ones for fertilizer. They are worth six cents a bushel for this purpose, and it would not pay me to have them picked up to feed or sell, as a rule. I have tried all ways. But remember, there are not many of them. One-eye pieces seldom give many little tubers. I cannot give a man $1.50 per day to pick them up when so few and scattering, and come out whole some years. But when potatoes are a dollar a bushel it is different, or even seventy-five cents. Then most of the small ones can be sold for forty or fifty cents, which is margin enough above manure value to pay for labor and give a compensating profit. Such years we pick up all but the very smallest at once and store together, and sort in the barn as we have time.

We use no screen to run them over when putting in the barn or cellar. The digger shakes all earth off. They are clean as though sandpapered, one customer said. The little ones are not picked up, so there is no need of screening. There is a sorter made now by the Hoover digger people that will take out the little ones nicely, as they are shoveled in and run through. But I cannot use it in the fall; the potatoes are bruised too much. In the spring it works all right and will take out the small ones as fast as a man can shovel them in, while another turns a crank. One thing this sorter will do nicely: When the sprouts are just starting in the spring, say, half an inch to an inch long, it will take them about all off many times faster than the same men could do it by hand. It will not do this as well after they get much longer, as they are then tougher.

Did you notice that we pick as fast as we dig? Not dig a great lot ahead to lie scorching in the sun. Of course, the soil might be too wet for this, but in any ordinary weather we pick right up close to the digging, and put into the barn as fast as possible. Two or three days' exposure in sun will ruin any potato for eating. Two or three hours will injure it. Letting them lie to dry is all bosh, unless they are muddy. Just the ordinary soil moisture on them will not injure them, if stored at once. When you pit potatoes, do not the ones that are on the damp earth all winter keep the best? If some get pretty warm in the middle of the day, we set those boxes in the barn and do not empty till they get cool in the morning. The rest of the day they go right into the pile in bulk as dug, but carefully. They are not bruised, and are generally cool. Don't they heat? Why, they will average warmer than the temperature in the basement or cellar, of course, when dug in hot weather, and when we let in the cooler night air, the moisture in this warm air that rises up will condense when it strikes the cooler air above, and wet the top of potatoes some. With the care I have spoken of, there is little of this, and it soon dries off and the potatoes cool down and keep all right. Of course, if there was rot in the crop there would be trouble, but sound, cool potatoes will keep all right. Remember, this is not theory. I have put up thousands of bushels, year after year, in just this way. Once I took two big loads to a grocer on a boiling hot day in August. He wanted to store them in cellar for winter, but was afraid. I told him to follow my directions and I would warrant them. He *carried* them down cellar and emptied carefully in a bin some three feet deep. The next day when I called he was greatly alarmed. Said those potatoes were going to rot down. I went down to look at them and found them quite wet on top, as I expected, as it was a cool cellar. The man wanted to take them right up stairs and sell them at once. I told him to open windows so a little air could pass through and dry them off, and let them alone. That was the end of the trouble. He said half a dozen or so right on top that were wet too long rotted, but the rest were nice and fresh in the winter when he used them. I have not had much experience with rot, and am not sorry. When we did have it, it came in August, and I just let them lie and rot in the ground until the thing was over, then dug what was left. I would not like to store large quantities of diseased potatoes.

# CHAPTER XXIII.

## OTHER POINTS IN POTATO CULTURE.

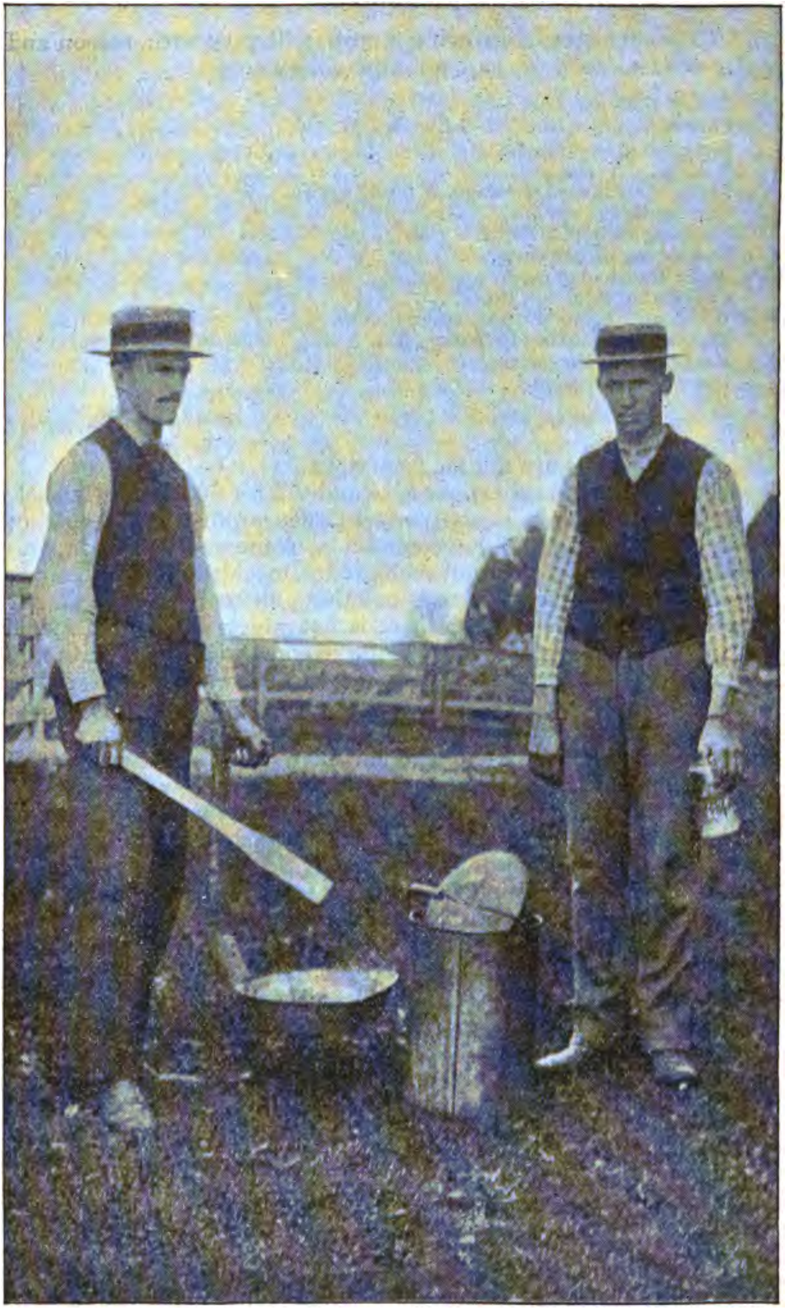
PEOPLE have often asked me what was the cause of the potato scab. To one and all I have said, these many years, I do not know anything about it. I have, of course, heard all the long list of causes brought out by different persons. I had no faith in them, because in my own experience I could think of instances where I knew the cause given was not present. For example, some one would lay the blame to wireworms, and I know I have had smooth tubers where there were wireworms, and scabby ones where there were not. It has been said that growing potatoes too long on the same land will cause the trouble. Well, I grubbed the trees on a certain piece of land, years ago, and put it in potatoes—land that never had a potato or plow in it before. The first crop was awfully scabby—entirely worthless. I have never grown a clean crop on that piece of land, but they were better last year than ever before. I plowed up my old orchard last year after grubbing out the trees. It had not been plowed in forty years. It was rich, mellow soil, and I expected some fine potatoes. But on a certain part of it the potatoes were more scabby than I ever saw before. So it goes. But one thing I am quite well settled upon, viz., that horse manure in some way starts the scab. I have not seen any report from any one else that favored this view, but often I have seen the result. For example, the spot in the newly cleared land, and also in the orchard, where scab was so bad, was where horses had made a practice of leaving their droppings for years. Perhaps it is only the accumulation of manure that made conditions favorable for the scab, and the same would have been the case if it had been an equal quantity of cow manure; but I think not. I have learned to be more fearful of trouble from horse manure than from that made by cattle. But I confess to great ignorance in regard to this trouble and a great desire to find out about it. I want to know how to prevent it practically. It looks now as though we were to get the mastery over it before long. Scientists are telling us now what it is. Prof. Bolley, of North Dakota Experiment Station, says: "The first cause of deep potato scab, as studied here, is found to be a plant organism of very minute character, which attacks the surface of young growing tubers, eroding, irritating and blackening the adjacent tissues." It has been found that the disease can be given to a healthy potato by transferring to it some of the scab plant growth from a diseased one. This much having been learned, Prof. Bolley has given much time to experiments in the direction of destroying these scab germs on seed potatoes. I may say briefly that he is satisfied that scabby seed will produce a scabby crop. This has been a much disputed point. Some have claimed that scabby seed was just as good as any other, and no more likely to bring scabby potatoes than was clean seed. In proof, men have declared they planted clean seed and got scabby potatoes, and planted scabby and got smooth. Well, I have been so well satisfied that it was a fungus growth, that I have never planted any scabby potatoes; but I have now and then had some scabby ones and it was hard to understand where it came from, if it was a fungus or germ disease. Prof. Bolley's experiments make this more plain. If you have some scabby potatoes in your crop, only a few, say, and pick up and handle them with the rest, the germs may get all over your smooth tubers. Think of how much pains I have taken to get only smooth ones, and picked them up in boxes that had just had scabby ones in and did not know that I was probably spoiling all my care! Again, it is learned that when the scab gets into your land it will stay in the soil from year to year. It is hardly known how long. I know it will stay all right for three years, or while a crop of wheat and one of clover are growing and attack the potatoes the next season.

What we now want seems to be some way to destroy the germs on the seed first, and then some way to get them out of the soil where they are present. The first we shall undoubtedly soon have; the second is not so easy. But the treated seed may be put on clean land that has never grown any scabby potatoes and be quite a step gained. If you raised any scabby potatoes, your seed may not be free from it, no matter how smooth, remember, unless you dug it by itself and put in clean packages and kept it away from contamination. If you buy entirely clean seed you do not know whether it is free from scab germs or not. Don't you see, the more we learn, the more trouble there is ahead for us? Perhaps I realize this more than you, from having tried to plant seed free from scab germs this year. Let me tell you just what we did. Prof. Bolley's experiments show that soaking the seed in a solution of corrosive sublimate for a time will pretty much destroy the germs. I went to a druggist and got seven papers of corrosive sublimate with two ounces, finely pulverized, in each one. Then I got three good, tight barrels. (I used flour barrels.) Also, three wooden pails. I put two ounces of sublimate in each pail at night and poured two gallons of hot water into each one. Then I stirred it well and let stand until morning. The barrels were first soaked so they would not leak out any of the poison and then we put thirteen gallons of water in each one and next poured the two gallons of poison into each one. We let this stand some four hours, stirring every few minutes so as to thoroughly mix it. Next, we washed the potatoes for seed thoroughly in two waters, and then filled the three barrels and let them stand in the solution one hour and thirty minutes. Then we tied a rope around a barrel and cover (a simple board) and put in a stick and twisted it up tightly and then tipped barrel over and poured the poisoned water out into a tub. Then we were ready to take the potatoes out, put in more and pour water back on them for another ninety minutes, and then take the next barrel, and so on. We used the same water three times, and then poisoned some more. Perhaps it would do as well used longer; we did not know. In all we treated some fifty bushels of seed. But when we took the seed out of the barrel our troubles had but just begun. What should we put them in? We could not use our boxes or barrels; there might be germs in them. We finally piled them on the grass and covered with blankets we knew were not scabby, and between wash tubs, milk cans, and some new bags, we managed to get the seed to the field, I hope, without a germ alive and growing on it. But that wasn't all. The planter might be, very likely was, foul with germs. Well, we cleaned it and poured boiling water all over it, and for fear the pesky mites might be hot-water proof, we dropped some seed by hand, having first soaked the pails used in the solution. All this represented two days of hard work for three men, and some risk from handling such quantities of strong poison. The strength of the solution was the same as is used in surgery, one part in one thousand, and will not hurt you if kept out of the mouth. A cut finger would be helped rather than injured. But one should be very careful of the dry poison, and of course that none of the poisoned potatoes are eaten.

The rest of the seed we planted was bought from a section where I am almost certain they were free from scab, and by planting right from the barrels with care I hope no germs got on them. As we planted on land that has never produced a scabby crop, we hope we may be all right and get well paid for so much trouble. From beginning to end I stood right over the potatoes, almost with a club, and I *know* there were no weak links in our chain of treatment, according to our present light on the subject. I wish I could now give you the result of this treatment; whether this seed does any better than that merely washed in water, as we tried, or than untreated seed, but they are not ready to dig yet. I may be able to get the result in later, before this chapter goes to print; if not, you will see it in *The Practical Farmer* in due time.

As we are beginning to learn about the scab, so we are about the blight and rot, perhaps. It looks as though soon we might ward off these troubles by spraying with poisons that prevent the growth of this disease on the tops. I have not tried this because we have little trouble this way on account of growing early potatoes and planting rather early, so they get too far along before the time for blight to do injury, for us to suffer much. I certainly should try it on late potatoes in a section where they are in the habit of blighting. Prof. Weed says we shall soon be able to spray with a mixture that will kill the larvæ of the Colorado beetle and prevent blight all at once. It looks a little as though we ought to have a dose put in for the flea beetle at the same time. They are on the increase lately here and do much damage; but as yet there seems to be no remedy. Last year and this, it seemed as though they would totally destroy our young plants before they got started. The leaves were eaten to a mere network.

By the way, I suppose I must tell how we manage the Colorado beetle and its larvæ. Really this little so-called pest has been a great friend of ours. Now do not be surprised! Yes, he has put money in our pockets. This is the way: Don't you know that for years and years after they came around many farmers let their potatoes go to the bugs? Yes, they did, and some do yet. But we soon found that the very worst years it cost but three or four dollars per acre to fight them successfully, and then we got at least ten times this amount more for our crop than we would if there were no beetles. Do you not see? Say three dollars an acre more expense, and forty dollars more price for years, because the beetles were allowed to destroy many acres of potatoes. We do not always look on our troubles in the right light. It made one extra labor to get a crop, but the resulting net profit was vastly increased. When the beetles first came we were obliged to use poison, there were so many of them, as no one kept their potatoes clean at that time, and the air was fairly alive with beetles. We have picked a half bushel of solid beetles in a day, and seemed to make little impression on the multitude. In haste I sent for an atomizer, and sprayed with Paris green. But soon I began to consider the injury to vines, even where not killed, and that some vines must be eaten to get the poison, and the risk of having poison washed off by a shower, soon after it was put on, and the fact that I must do it myself if I wanted to be certain no vines were killed by careless spraying, and that living in the midst of a dozen acres of poisoned tops, with the wind blowing, might not give us the purest air possible, and that sooner or later, some accident might happen from having poison about the place, and that the beetles were not nearly as numerous as at first, and that I believed we could manage so as to pick them by hand successfully. And we have for a dozen years. When we went at it rightly, it was not a very large job. We have kept twenty-four acres clean two years, eighteen two years, and about a dozen, other years. The great point has been to pick the first beetles as fast as they come, as soon as you can see here and there a plant up, and keep right at it persistently for a few weeks. A quart glass fruit can is the best thing to pick in, holding in the left hand and walking along, picking from two rows at once. It is not best to get down and poke around a plant and try to get every beetle, which you cannot do; but go along, picking what you can see readily. One will get more in a day in this way. We used to use a six-gallon tin pail with a tight cover, to empty cans into, and then at night we poured boiling water on them and by the next morning they were ready to bury in the manure. I say we used to use this pail. They are not nearly so plenty the last two or three years, and the pail is hardly needed. I do not think we have one-tenth as many beetles now as ten years ago, whether because we have fought them so persistently, or because they are "running out," or their enemies are increasing, I hardly know. Probably it is a little of all three. After the larvæ begin to hatch, we use a common eight-quart milk pan, attached to a long handle, so we can stand up straight, and hold the pan under the hill with the left hand easily, and with a long paddle about four inches wide, held in the right gently (for fear of injury to vines, not to bugs), gather them in from a row on each side, as we walk along. These pans were emptied in the big pail also. As I write I can see a man passing back and forth with this pan, and hear the rap of the paddle on the pan occasionally to keep them from crawling out. We get some old beetles, of course, in with the larvæ. This plan has actually cost me less money than using poison, and it has many other advantages as above mentioned. It is not practical always on a garden patch; the larger the field, the more practical. Beetles fly only in warm days. We always plant on new land. They must fly on, as they winter near where they were last year. They never fly far after they come to the edge of a field of potatoes. Hence we gather them around the outside of the field as they come, on days when they fly, and prevent their getting all over, for a time at least. If raising 100 acres, I should never think of using poison. There is no question in my mind that a little Paris green even is injurious, although not killing the tops at all. Prof. Lazenby and other skilled botanists have agreed with me on this. I believe I can save the plants enough in this way alone to pay for hand picking. I am no crank on this subject, but have simply made it a matter of business. I might say, quite a few potatoes are grown about here, and all fight bugs as I do, so far as I know. I neglected to say above that thorough work at first for three or four weeks nearly ends the job for the season. The getting of the beetles before they lay many eggs, is the point. Later you may get them, and have a full crop of larvæ, too.



Tools for Gathering Bugs.

The exact cost of growing a crop will vary with season and soil. It costs us now, say, about as follows:—

| | |
|---|---|
| Use of land per acre, | $6.00 |
| Plowing, | 1.50 |
| Harrowing, | .50 |
| Rolling, | .25 |
| Eight bushels seed, average, if home grown, | 4.00 |
| Cutting to one eye, | 1.25 |
| Planting with planter, | 1.10 |
| Harrowing three times, | .50 |
| Three times over with weeder, | .60 |
| Cultivating some ten times, | 4.00 |
| Weed pulling and hoeing ends, | 1.00 |
| Digging and putting in barn, | 6.00 |
| Keeping beetles off, | 1.50 |
| Use of storage room, | 1.80 |
| | $30.00 |

These figures are not far from right.

If we get 200 bushels per acre and sell for fifty cents a bushel, can you not see there is 200 per cent. net profit on the cost of production? I think I have hinted at some such profit in preceding pages, and I have got such profits, too, although, of course, not always. And then there is one thing about these figures that is worth noticing, viz., that there is not much money out in the cost of production. I have just been comparing them with the cost of a crop as figured ten years ago. Let me show you what I mean. I find ten years ago I paid $1 an acre for dropping seed. Now the machine drops it and I ride and put the money in my pocket—keep it there—don't pay it out. Then digging and picking up cost $8.75. This was cash out. Now it costs $6, and only $2.25 of this is cash out; the rest for my horses and myself riding the digger. Ten years ago hoeing was put down with the hand pulling of weeds at $3; now at $1—$2 less paid out. Of course, interest and wear of machinery takes a little of this money saved, but if properly cared for there is a good deal left for me.

The amount of tillage given above calls up a point that may be of interest. My noted friend, J. M. Smith, grows larger crops of potatoes per acre than I do or can, on his very highly manured garden soil, and in his more northern latitude of Green Bay, Wisconsin, and he does not cultivate more than one-third as much, perhaps. Now, how easy to say that I cultivate too much because Mr. Smith does less and succeeds better! Let us look at this carefully, for it is an important point. Mr. Smith's land is enormously rich. He puts on some forty loads of manure per acre and has been doing it for many years. It is a garden soil in a very high state of fertility. It is loose and full of vegetable matter. It is in a condition where tillage, except to keep weeds down, is of comparatively small account. Mine is a heavier soil, only fertilized up to a good farming condition, not for garden crops. I must have plenty of tillage to help make plant food available, not having an excess right at hand, and to prevent evaporation, which is more rapid from my soil with so much less vegetable matter in it. His tillage here with my conditions would be ruinous some seasons; mine with his conditions might be entirely unnecessary and extravagant. The richer the soil in available plant food, the less tillage may be required. Right in this same line some old farmers say: "We used to get larger crops than you do now with only an A harrow to scratch the ground a little. What is the use of all your costly tillage tools?" This is true, but their soil was then, if they got such crops, fertile and full of vegetable matter. They were some like Mr. Smith's garden. Now the vegetable matter is often pretty well used up, and soil harder to work and coarse and lumpy. It is wise to get this old condition back by clover growing and otherwise, but mean while we must pulverize the lumps and stir up the soil to let in air that could once go in easily without. As the soil is not now mellow from its natural condition, we must make it somewhat so by hard work. Conditions have changed and we must change to meet them. Sixty years ago, large crops of wheat were grown on this farm, and with the A harrow only. Twenty-five years ago it had got down to eight bushels per acre with such tillage. With the advent of better tools by tillage only we raised the average per acre decidedly. We could have done it with plenty of manure and little tillage, but little of manure and plenty of tillage was within our reach and the other was not.

I have just been reading Mr. Carman's excellent book on the new potato culture, and would like to quote what he says about picking beetles by hand: "When writers advise us, as many have done, to gather the beetles by hand, we want to tell them that if they would practice this advice for one season they would not care to offer it again." Well, friend Carman, we have tried it on many acres for many seasons. The trouble with you was just what I stated before reading your book. You tried it, probably, on a small patch, with plenty of beetles all around, perhaps. I would not do it myself under those circumstances. To-day, June 30th, I do not think you could find a tablespoonful of beetles or larvæ on my farm. The season for them is practically over for us. But I do not care to push my way at all, simply to fully describe "Our Farming."

The best way to store potatoes for winter in the cellar is in boxes or barrels covered from the air and light. You cannot keep all the air out, but you can and should the light. A cellar light enough so you can see to walk around, even, is no place to store potatoes in uncovered. Tubers of the finest quality will soon be poor enough. I seldom eat good potatoes away from home; at a hotel, practically, never. People do not take care of them, even if they are good when they store them. If you have a little light in the cellar you can, at least, put them in tight barrels, and cover tightly. A circulation of air through them is injurious. You cannot do worse than spread in bins, a foot or so deep, in a light cellar, unless you spread thinner. Our house cellar is arranged with three rooms. We go down into one that is always light enough for one to see fairly well. There are doors into the other rooms where potatoes are kept, and over the windows are curtains of thick black cloth. These are so hung that when you open a door you can put up your hand and pull a string and open a curtain and let in light, and shut it out when you get through. The plan is simple. The curtain is nailed on across the top of sash. Then it is nailed to a rather heavy stick at the bottom—the stick on the inside. The string is attached to the middle of this stick at one end, and to a nail 6½ feet high on opposite door casing. Put another nail six inches lower in casing, and, as you pull down on string to open the curtain, pass it over this nail, and it holds it open a little until you go out and slip the string off of the lower nail. The weight of the bottom stick holds the heavy cloth down against the sash closely. We have it arranged also so we can open and shut the windows by a string from the doorway, when the room is full of potatoes. We have been using this simple plan for nine years, and it is complete. The cellar is always dark, except when you want it light, and it is no trouble to manage the light. Articles not injured by light are kept in the light room. The other rooms were built expressly for storing potatoes, although we seldom use them, as we have one cellar room in the barn 13 x 30 feet, and do not intend to hold potatoes over winter. But we are arranged so we can. Now and then a year, when the barn gets overloaded, we have to put a few hundred bushels in the house cellar temporarily. They can be wintered in large quantities, piled right on floor four feet deep; but, if early potatoes for seed that I wished to keep from sprouting as long as possible, I would build a temporary board floor, with cracks in it, six inches above cellar bottom, and board around sides in same way. Then put in the potatoes. You can then let cold air in, under and around them, and two or three tubes, a foot square, running up through the heap would help, also. You could thus cool pile down to a lower temperature than it would get from a cellar bottom. This has the temperature of the earth, seldom below 50° in a deep, large cellar. Fixed as I have stated, you can cool them down to 34°, and hold them there during cold weather, by spending time enough. It would be well to cover the top with blankets, old carpets, etc., to prevent sudden chilling. Cold air let into the cellar will settle to the bottom, you know, and pass under the pile, and cut them off from the warmth from below. Being for seed, exposure to light will not matter. I had rather they were not exposed to air, but one cannot well cool a large mass without. I have cooled 800 bushels in a body in this way, but they were not put in the cellar until cool weather, and then from heaps. Would hardly want to pile them so deeply in August, fresh from the field. Planting as early as we do, there is danger of frost catching the young plants. It is so small a risk that we think it best to take it and plant as soon as the ground works nicely every year. One year only have we suffered much. Then we had twelve acres cut down into the ground on the 29th of May, after they were some four inches high. For several weeks after we had no rain. Between the two we probably lost half the crop. Another field coming up just after the frost yielded very much better. But I have always thought that if we had had plenty of rain, the injury would not have been anything like as serious. We have farmers who think they get as good crops when the plants are frozen down, and, possibly, they may under the most favorable conditions, as they may from using sprouted seed, but the rule must be the other way. It is a serious check to freeze a plant into the ground after it is well started. A frost that only blackens the leaves a little I should not mind much. But when the stem is destroyed into the soil and an inch or two below the surface, I had much rather it was in some one else's field. In such a case, harrow the ground all fine on the surface, and wait patiently for them to come on again. They will grow even from one-eye seed, but not from the seed piece. A side sprout comes out of the old stalk. The potatoes with me matured about as soon as if they had not been frozen down and lost that much time—what it took to renew the frozen-down growth. This shortening of the season must work injury, more or less, according to the amount it is cut down, seems to me. We have saved potatoes from injury by frost when just coming up by throwing a little earth over them. This was done with Planet Jr. horse hoe. The rows were so straight we covered a row each side at once, but needed some one to lead the horse. Of course, every plant did not get perfectly covered; but most of them were saved, and the covering of six acres, I think, was done in half a day. I did not like the ridging up so early in the season, but we were sure it would freeze, and chose the lesser of two evils. We did not harrow off the dirt, but let them grow through again, and then used the weeder, but, of course, we could not level it down again entirely.

You have heard farmers say, doubtless, that their cattle were not doing well because they were lousy. But, really, were they not a little mixed? Wasn't it this way? Were they not lousy because they were not doing well, at least usually? So it is in potato culture somewhat. The beetles attack the weakest plants. Haven't you noticed it? Go through the field and notice. The little, weak, feeble plants are most all eaten up, perhaps, and large thrifty ones scarcely touched. The beetles choose these feeble ones to lay their eggs on. They are much like humans, ready to kick a man that is down. Do you think this has no practical bearing? Well, it has. A rich soil, plenty of feed in it, strong plants, as may come from good seed, and good tillage that may help them along rapidly, will lessen very much the cost of fighting bugs. The potatoes quickly outgrow them, and some way they do not seem to thrive as in a poor, starved, neglected piece. "Unto him that hath shall be given, and from him that hath not shall be taken away even what he hath." Do not even beetles and the Hessian fly have to obey that law?

Later: The scabby seed we treated produced almost entirely smooth potatoes. Good, smooth seed, or almost smooth, mixed with the scabby in picking up, and washed well before planting, gave moderately scabby crop. As far as I can tell from one year's trial, corrosive sublimate will destroy, practically, all germs of scab on scabby seed.

# CHAPTER XXIV.

## PREPARING FOR WINTER WHEAT.

IT has generally been considered that the light, sandy and gravelly loam soils were the best for wheat. We hear of natural wheat land. The above is the kind meant. And it is true that Nature has made them all ready for successful wheat growing, as far as drainage, at least, is concerned. But I believe the clay soils usually can be made just as productive after being tile-drained by man. It will take more labor to prepare them properly, and the risk from winter killing is slightly greater. Still I would not hesitate to make winter wheat one money crop in my rotation on well-drained clay soil, and I should expect to raise good paying crops, too, on the average; but the tile draining would be the foundation, without which my success would be a matter of luck very largely. With the best of preparation, an open winter and much freezing and thawing, on undrained land, is certain to take all profit out of the business, and will, probably, make you work for about half what you pay your hired man. There can be no really successful wheat growing on our heavy clays, particularly when flat, without drainage. I have watched this point for years, as there are many clay farms in my town. Once in a while they have a good paying crop on such land, and then they have almost failures or, perhaps, ten or fifteen bushels per acre. It would be hard to find a real clay farm where no tile draining has been done that can show a yield on the average that will pay cost of production for ten years in succession. Resort is had to surface draining in narrow lands on the flat clay soils, but this is only a makeshift. After reading chapters on Drainage, I think you must see that, although better than nothing, it is not the best way.

If starting out to make a success of wheat growing, I would first of all attend to the draining and then to getting available plant food enough in the soil to bring as large a crop as the straw could stand up under, or even a little more, so as to make sure of enough. Anything less than this is not business. No good farmer would think of working a team that was so poorly fed that it could only do a half day's work each day. At a glance that would be seen to be extremely foolish. But these same men, year after year, are satisfied to let a crop of wheat go half fed, and hence do only half what it might for them. Is it not just as unbusinesslike to do the latter as the former? I can see no difference, only that it would be cruelty to the horses to half feed them. It is not direct cruelty to animals to starve the land, but indirectly it causes pretty hard times among the humans that live on the income. Half-way work is bad all around, friends, any way you can look at it. But how are we to feed the crops like this, practically? You would not have us pay out all our money for fertilizers, would you? No. Sometimes the addition of a little phosphoric acid may pay you, or potash to help clover grow, but I can only advise in the lines that I have followed. I have seen my own wheat yield work gradually up onto a paying basis without buying any fertilizers. If you have read thus far you will see all the steps that have led to this, but it will do no harm to repeat them as connected with wheat culture. The great source of food for wheat on my farm comes from clover growing in regular rotation, in connection, of course, with careful manure saving. Even at the present low prices, we can make money growing wheat in rotation with clover and some other crop suitable to the farm. It is potatoes, you know, with us. It might be corn on some farms. No fertilizers are needed then. A clover sod may be turned under directly for wheat; but it is not as well as to grow a crop of corn or potatoes first and then put in the wheat. There is most too much nitrogen in the clover, if the growth was heavy, for wheat to follow. The growth of straw is too great, and the wheat lodges and yield of grain is not up to expectations. Our best farmers are generally settled on this point. I find almost too much nitrogen after growing a crop of potatoes first, where the second growth of clover is turned under. It is the same where manure is applied directly to the crop here. My next neighbor has a piece badly down. He put the manure on the clover in the spring for potatoes, and then drilled wheat in in the fall The manure got rotten just about in time for the wheat, and has given it most too much nitrogen. The worst piece of lodged wheat I ever had came from manuring potato ground in the spring in this same way, and a dry season following so the potatoes used little of the manure. I prefer to use the manure to grow the clover. It is safer. A common practice here is to keep manure over till fall for wheat. Where kept without loss and spread thinly over the surface after plowing to help the growth of grass and clover, I would not object to the plan particularly, but believe mine is better, unless land is so thin that a good stand cannot be had without top dressing, which may be the case on some thin clay soils.

I do not believe there is any better preparation for wheat than a thoroughly worked potato field, which had been a heavy clover sod the year before. Possibly a summer fallow might show as good returns, but it would not be as practicable, as the income from potatoes would be lost. Further south, where the season is longer, wheat after clover and corn would be, perhaps, nearly as good. You see, what I do is to plow my clover sod in the spring for wheat and work it all summer, much like the old-fashioned summer fallow, but meanwhile I get $100 per acre more or less out of the potatoes that are grown incidentally, and do not decrease the yield of wheat particularly by taking off the potatoes. The clover has left something in the soil for the wheat, but the tillage all through the season has also helped get plant food ready. The same if it had been a corn field. When we do thorough tillage and follow it up properly, we are helping more than the present crop. In fact, it is hard to say just where the benefit will end.

But now let us speak of the more immediate preparation, after the previous crop is removed, whatever that may be. I have preached for many years that one or two dollars' worth more labor per acre, judiciously expended in extra work on the wheat ground, in better preparing it, would bring the farmer a much larger percentage of profit than what he had already done, in a great many cases. I believe it fully, and shall continue to preach it; and still this extra labor and all may be lost from lack of drainage. I think I have told you that good farming may be thrown away on wet land. How all improved methods link in together and depend on one another! Drain your land and then work it as much again as is commonly done, and do it understandingly, and you are on the road to getting plenty of available plant food for a maximum crop. I want my land just as fine and firm as I can get it, and I pay little attention to the number of times it is harrowed, but just keep agoing until it is right, feeling entirely certain of good pay.

When I began farming I have told you, I think, that it was with only a plow and a straight-toothed harrow and roller to prepare the land for a crop. With these I did the best I could. But, particularly when I was preparing a field for wheat, I never felt satisfied. If it was for corn or potatoes and not well fitted, the deficiency could be partly made up afterwards; but with a wheat crop, the tillage must be given before the crop was put in. One fall I was preparing a clover sod for wheat. It had been plowed and harrowed and rolled and perhaps harrowed and rolled again, until pretty well settled. The harrow would no longer take hold. I felt as though I wanted something to tear that soil up so I could harrow and roll more. I was not satisfied with its condition, but I had no tool to do it with. In town one day, I met a man with a sulky cultivator, the first I had ever seen. It was a heavy, complicated affair, but from the first moment I thought it would do just the work I wanted to do on my wheat field at home, and it had a seeder attachment that would put in grain better than I had been doing it. Well, as badly in debt as I was, I gave my note for it for $50, and took it home. Then I rode it lengthwise and crosswise of my field, and harrowed and rolled, and then cultivated again, tearing the ground up most thoroughly. When it was finally worked down and ready for seeding, it looked no different, particularly, from usual, but I knew it was a more thorough job than I had ever done before. Well, what was the result? Ten bushels more wheat per acre than the field had produced before, and no manure put on since raising the last crop. Then I felt good, you know. The investment had paid. I could pay the note and have money left. Of course, that cultivator was used even more the next fall. Good neighbors said, as they saw me keep tearing up the land: "Terry will do almost anything if you only let him ride." But Terry's riding was only an incidental matter. Success is what Terry was after. Well, the second year I got thirteen bushels more wheat per acre on another field than it had produced before, and no manure used, except clover sod in rotation, of course. My old friend, Mr. Lemon, of Northfield, who sold me the tool, called here not long ago and we talked over the start I got in tillage from his trusting me for a cultivator. Now, I do not say all this great gain came from the better tillage. The season may have been better, or the clover growing may have been increasing the available fertility, but I feel sure a good, large slice of that ten and thirteen bushels per acre came directly from the better preparation of the land. It will not matter if you decide that a part was due to the clover. I am presenting the claims of both tillage and clover, for making enough plant food available to grow a large crop of wheat.

After our potatoes, so much tillage is not needed, as the land has been worked nearly all summer. I would not allow it plowed, when preparing it, as there would not be time to get it settled again properly after potato digging time. We now work it lengthwise and crosswise with cutaway harrow (will try Clark's revolving cutaway plow this fall) and then use Thomas to smooth and level it, and then roll and harrow and roll until we get it as fine and firm as we can. This is done all at once, as there is no time to wait. If preparing oat stubble or sod ground, where there was plenty of time, I would work every few days, particularly as soon as it was dry enough after showers. When I drill in the wheat with my Empire drill, I want the soil so firm that a horse hardly sinks in more than an inch. We go over it until really a horse has stepped on nearly all of it. But always remember, this must be done when it is reasonably dry; in fact, I prefer it quite dry. You can do no damage then. Some use the drag or float or clod crusher, as it is called in different sections, in the place of the roller. This is made of planks or scantlings, and drawn over the surface it makes it look nice and smooth. But a roller draws easier and packs more, as it seems to me. Think a moment. The crusher has a large bearing surface and little weight. The roller with me on, and some stones, has a large weight and a small bearing surface on the ground at a time. Which will do the most packing? I must have a roller. They cost but little now, anyway. I roll always the last thing before drilling, but never afterwards.

But now I have preached fine tillage pretty strongly. There is one drawback that must be told. On our heavy soils, if they have been ground into a powder almost, by so much working, and a heavy rain comes right after seeding, sometimes more damage will be done than if land was not worked down so fine. It runs together into a regular mortar bed and afterwards bakes. If the soil was coarser on the surface this would not occur to nearly the same extent. There is no question but that there is this risk to run. I have suffered some in this way, but all other years the pulverization paid grandly, and I will take the risk, with this precaution, that I will try to sow after this heavy storm rather than before. If the weather is threatening, barometer low, air muggy etc., unless too late to risk waiting longer, I will not sow until after the storm is over. I much prefer anyway to sow after a rain in moist soil. Work when dry, but sow when moist. This causes a quick start. I dislike greatly to sow in dry soil, but sometimes have to. A neighbor once came over where I was working my wheat ground along in the afternoon. It was threatening a heavy storm. He said he had his wheat land all ready and hardly knew whether to begin drilling or not. I told him I was ready, but would keep on working my land and not drill just before a heavy rain. He thought that was best, but went home and went to drilling. Before he got in half of the field it rained very hard and he was delayed some days about getting in the rest. All through the fall and spring you could see to a line where he stopped drilling before the rain. It was much poorer wheat. It could hardly get up; did not near all of it, and grew feebly. That put in moist soil and no heavy rain coming afterwards made a much better growth. Do not understand that I want a seed bed hard. You might get it too hard by working when wet; but never too firm by working when dry enough. We want mellow but firm, settled soil. Then the little feeble plants have a chance to grow from the start thriftily. They have fine soil right around them. Think how small a grain of wheat is. To give it a chance to start well, it wants to be in soil prepared as for a flower bed or for garden seeds. Then you can drill wheat shallow and it does not have to send its roots down some inches for suitable feeding ground, as when the surface is cloddy. Then it can grow on the surface more, a net work of roots spreading all through the fine surface soil, and when freezing and thawing weather comes the whole surface rises and falls together more. It is hard to heave out wheat, growing strongly like this on drained land, so as to greatly injure it. But suppose the surface is not fine, and the roots have gone down more to where it is finer, they must surely be broken more by freezing, and the plants having but few surface roots, instead of a mass of them, are easily destroyed. Again, fine, compact soil will not hold water in as large quantities together, and the action of frost will not be so severe. I was pleased to hear Prof. Webster of the United States Department say last winter at an institute, when inquired of about how to avoid injury from Hessian fly, that it made more difference how wheat was put in than when. That was just solid truth, as I believe. We will consider this point later on, but remember that this grand start helps even to preventing damage from the fly. You can see how damage that would nearly destroy a poorly started crop would hardly be noticed in a good one, and would be soon outgrown.

Now, I wonder if any reader of this book will again put in wheat on land all covered with clods, from little to very large, perhaps arguing that these will protect the wheat? I hope not. Wheat needs feeding properly and it will protect itself just as a well-fed man might go through a terrible storm all right, while he would freeze to death if half fed, and thus weakened and feeble, although there might be sacks of provisions piled up all around him to shelter him slightly from the wind. Pulverize the shelter and let the plants feed on it and gain extra size and strength. There is no winter protection equal to a large fall growth falling down around the plant.

But now we have the properly prepared soil, well drained naturally or with tiles, and plenty of available plant food ready, let us think about preparing the seed. This is a matter of some importance, but not as much as the former questions, perhaps. First, we want a variety suited to our soil and that will sell well. Occasionally our farmers get hold of some variety that yields well but is soft and not wanted by millers at full price. A variety that may do finely on certain soils may not do well at all for me. There is no question about this. I have tried varieties that I know did well in certain sections that were very poor with me. One cannot spend much time in experimenting, and still he must spend some in order to know that he has what is best for his soil. I would advise that you watch the Experiment Station reports, and when on land similar to yours and in something the same latitude, they decide from some years' experience that a certain new variety is a real acquisition, get enough to sow an acre and try it on your farm. If it fails, you will not lose much. If it is better than what you have you can sow more. But do not put the new variety on the best acre on your farm. Be fair. Give it an average chance only and watch it in every way. After two or three years you will know something about it in this way. I have tried two promising varieties that shell badly, which alone will prevent my ever growing them again. The land where I grew them was full of wheat in the clover the next year. This report did not get to me and it cost me a good deal of trouble to find it out. Really I doubt whether there is any better wheat on earth to-day for my farm than the old original Fultz. It has done well here for a long time and has no serious fault. I sowed nothing else last fall. I have had it ever since it first came around.

Of course, it goes without saying that the seed wheat should be entirely clean. Some will differ with me about being so particular, but it is business. Wheat will turn to chess when your pig grows up a cow. You sow a little chess in your seed, hardly enough to be noticed, and then an unfavorable season for the wheat destroys more or less of that and leaves the more hardy chess to grow; or else the seed of the chess is in your soil. It will lie there dormant for many years. For at least fifteen years I know there was no chess in a field back of my house. I never had a grain in my wheat—not one. Last year there was a half acre of strawberries in this lot, and soon after the berries were all picked chess came up all over. I know I had not put the seed there. It was there when I came here, and for all these years had remained in the soil in some way. We had a frost in the spring that killed many of the strawberries. It would be just as plausible to say they turned into chess as that wheat does. Remember this and do not sow any foul stuff. I have picked over by hand fifteen bushels of seed to get out a tablespoonful of cockle and chess that my mill would not take out of as small wheat as the Fultz is. A white sheet was put over a table and the wheat spread out on this to a single thickness, a little at a time, to get out the foul seeds. How many of you would go to that trouble? Well, my wheat is all sold for seed and that makes a difference; but I was just as particular when selling at the mill. I do not like to stop short of the best. And it is this that has made my wheat all wanted for seed. Well do I remember the first car load I ever sold for seed. It was to a stranger in another State. He had had trouble in getting clean seed and was afraid of mine. After writing several letters, I at last told him that if he could find a teaspoonful of anything but wheat in the car load I would give it all to him. I do not believe there was one grain. It is a pleasure to have such wheat instead of quite a percentage of cockle and chess.

In a good wheat section, I do not believe anything is gained by changing seed, getting it from a distance. I live in the best of the winter wheat belt. I am unable to see anything to be gained from getting seed from any other place for me. If I lived in Southern Ohio or Kentucky, for example, where wheat does not make as perfect a growth, I think it would pay me to get seed from Northern Ohio. This is not mere opinion; it is founded on good sense, and is for the same reason that I send to Maine for seed potatoes, when a variety has somewhat run out here, because potatoes grow to greater perfection there. And then I have sold my wheat in one locality in Kentucky every year for some ten years. Why do they keep buying it? It must pay, and from reports received, I know it does pay. Do not think I am advertising my wheat. No need of that. The parties who have had it engaged it all last fall for this year, and to date (July 1) two other parties, who have had some and tried, each have written, and wanted it all. I could sell ten times what I have right in that section, where it has so long been tried. This, I think, is partly because the seed comes from a good section, partly because the Fultz is just the right variety for them, as for me, and more or less because by careful selection and care my Fultz has not lost anything. Perhaps this may sound a little egotistical, but why else has the wheat become known in that neighborhood as Terry's wheat, as it has? And why is there such a strife to get it, when it could be bought in market for less money? A sample was obtained by the Experiment Station, and they wrote me to know how it originated, etc. It is simply the old Fultz selected for years. And now I must tell you how I select it. Not from the bin where good and poor may be altogether, that is, wheat yielding say forty bushels per acre, and that giving, perhaps, not over twenty. Such places are to be found in all fields I ever have. It is not all the very best. Wish it could be made so. My plan has been to select, say, half an acre of the very best found when cutting, and put the wheat in the barn by itself, and thresh by itself, and take my own seed from this. Like certainly has a tendency to beget like. If this best half acre was down badly and wheat somewhat shrunken consequently, I would still use it for my seed in preference to wheat that was very plump but did not yield as much. I have tried lodged, shrunken seed (of course, not very badly shrunken) side by side with the plumpest, and see no difference in growth of plants. This seed is run through a mill, and the smallest and poorest grains taken out, but is not graded; that is, just the very large plump ones saved. I would not like it graded. Did the largest berries grow on the heads with greatest number on, suppose you, or on heads with few grains? Which do I want to breed up to? You see the point. Grading might throw out the very best seed. Were it practicable to go into the field and select the best heads from the best part of field, then I would be ready to grade the seed and take only the largest. Have you not noticed that thin wheat has larger grains sometimes than very heavy wheat? In taking wheat from the bin and grading, do you get what you most want to propagate? Now you can see why I could not get all the cockle and chess from my wheat by running through the mill. By grading it I could, but not when saving the moderate-sized berries. The cockle and chess were too large. Hence the hand picking. I am sure you will do best to select the best spot in your field, and save your seed from there, rather than take from the general bin.

# CHAPTER XXV.

## OTHER POINTS IN WHEAT CULTURE.

I NEED hardly say that the best known way of putting in winter wheat is with a good drill that deposits the grain uniformly. Still, I have raised an average of 35 bushels per acre for five years in succession put in broadcast with the seeder attached to my old sulky cultivator. On drained, moist land it is all right, but in a dry fall, when wheat must be put in almost in dust, it comes up much better when drilled in. My potato stubble is quite apt to be dry, and one or two experiences of this kind, where my wheat failed to come up as evenly and quickly as what was drilled in, made me decide to always drill. You know they have wheels and shoes to follow the drill hoes and gauge the depth that they run and press the soil over the wheat. I thought them to be a nice thing at first. They are on unevenly prepared land, beyond doubt. But on land made as uniformly fine and firm as mine, I can see no advantage in using them after two careful trials. The wheat came up no quicker, nor did it stand the winter any better. I believe in shallow sowing in fine, firm soil (soil fine clear to the surface, and no lumps). I want no wheat put down more than an inch, unless it is so dry that I fear it will not germinate at that depth, when I would put it a little deeper to get through the dry surface. Of course, I would not sow until moist if I could help it, but sometimes it is late before we can get the potatoes off, anyway, and if it happens to be dry we are afraid to wait longer. I find that my drill with the teeth set way forward and the soil well rolled, will put the grain down just about an inch deep, and as uniformly as one need have it. I do not suppose one-half an inch, more or less, makes any particular difference; but I want it near the surface. I have often seen men drilling where the hoes went down in places three or four inches, and, perhaps, in other parts of the field not half as much. Wheels on the hoes would pay them, because then, if they were properly set, they could not bury any of the seed too deep. As to the time of sowing, it makes a difference where you live. In general, I prefer to take my chances in sowing rather early. I find farmers pretty generally think this way where they have been successful as wheat growers. The weak point in our rotation is our inability to get potatoes off in time to sow as early as we want to, some years. Here, in Northern Ohio, I would sow about the 8th of September—earlier or later, as the conditions might be found right. If we had a good rain the 4th, and land was ready, I would put it in soon as it was dry enough after the rain. I would wait till the 15th for proper conditions. But you say, Will not the Hessian fly injure your wheat sown so early? I will take the chances. I never have had much trouble, and they are here, too. I had much sooner risk a strong, rank growth against the Hessian fly, here where I live, than a feeble growth from too late sowing against the winter. We would be rather safer against attacks of fly by not sowing till about the 20th, but I would not wait. By the way, Prof. Webster got off a pretty good thing last winter at an institute on this point. He said the Hessian fly should have exercise. Do you see the point? A farmer in this town once said to me when I asked him how his wheat turned out, "Why, one piece was good, but the other was almost a total failure from the fly working in it." "Why did they work in one and not the other?" I asked. "Well, to tell the truth," he said, rather shamefacedly, "where they did so much damage, we had put wheat after wheat." Oh, yes! He did not give the fly any "exercise." He put the crop right in where the fly was waiting to destroy it. Very unwise business. Rotation, so the fly isn't on the ground sown, and strong, well-fed plants would be my remedy against this pest. Prof. Webster says that burning the stubble where wheat is to follow wheat would destroy them. I would dislike to do this. Would try careful plowing with a jointer, and see if I could not turn them well under. But do not make a practice of following wheat with wheat. It is not best, as a rule.

But now how much seed shall we use? This depends on the fertility of the soil, and time of sowing, and variety of wheat. On rich soil less seed will do. It will stool out much more than on thin soil. If you sow early, less seed will do, because there is more time for it to stool. You may sow less of a variety that has small grains, because there are more in a bushel. All very simple and sensible, is it not? We want to get a good growth that well covers the ground for winter protection, or at least I do. If I sow early, five pecks of Fultz would be ample for my land. Four or four and a half would do very well; some years be plenty. Should I be delayed from five to ten days about sowing, I would add a peck, and in the same proportion if longer behind. I would thus strive to make up in number of plants what I fell short in size, so as to get something near the same show above ground. If I should sow six or seven pecks early on my best land, unless we had an extremely dry spring, it would lodge terribly. About this I am certain. Thick sowing on rich land tends to increase lodging. The best known preventive is thinner sowing. You will get just as much grain, if you do not go too far. With thick sowing, the growth of straw is weak and unhealthy, and goes down easily and stays where it goes usually.

With less plants they grow more naturally. The straw is heavier, the sun gets in more, and the plant is healthier. Serious lodging is not nearly as likely to occur. My friends, Thorne and Hickman, of our station, assure me, that in all their experiments, they have found the above true, and they do not know of any fertilizer that can be sown on the crop that will avail in this direction. And I have the same from other good authorities. If possible to keep my wheat up always I could get greater yields, and hence I have sought far and wide for a way. I do not believe it possible on our soils and with our storms to keep wheat up that yields much over thirty-five bushels per acre, and sometimes not that, although I did have one field that produced just forty, stand up fairly well, except about an acre.

Does it pay to harrow the wheat in the spring? I do not think it would on my soil. It starts up so quickly that it covers the ground, so harrowing is not much needed and would not do much good, before the ground is dry enough, usually, so I would want to put a team on it. I have a horror of tramping my land in the spring when it is at all wet, or even moist, and I believe it is wise to have it, too. Breaking the crust might do some good if one could get on just right, if, say, it dried up suddenly and early, and then we had a slight shower that moistened the surface slightly. But the trouble is that the only entirely safe way to sow clover seed is very early, and that prevents harrowing later, of course. So for these reasons I have never harrowed any wheat. Some of you will remember what a craze there was in this line, years ago. I have carefully watched, and some men who claimed enormous results from harrowing at that time, I notice, have quit doing it, or saying anything about it. We reasonably conclude that they were a little too enthusiastic at first, and it does not pay them to keep up the practice. It has died out, as it seemed to me it would, because our best farmers do not want to tramp their land in the spring, and do want to sow their clover seed early.

The lay of the land has something to do with one's success in wheat culture here. An easterly exposure is very safe. A northwesterly one is not nearly as good. I have both and the difference is decided. I have tried to protect the wheat on the northwest slopes by spreading a very light coat of straw on at the beginning of winter, as soon as the ground froze so we could drive on. I have had varying success. First, never try it on undrained, cold clay soil. It will make it worse. On a well-drained soil it has twice done me some good. The wheat was decidedly better. I put on only a very light coat. You could see through it easily all over. Wheat is readily smothered if you get on too much. One year it did me decided damage, as did also manure spread as a top dressing on some poor spots. It happened thus: The winter was remarkably warm and open. Wheat grew nearly all the time. Where the straw was put it was more sheltered and grew ranker and more tender towards spring. Along in March we had a severe freeze. This tender, sheltered wheat suffered worse than that which was not mulched, and hence was tougher, not having made so great a growth. But this was on level land, not on a northwest slope. On such a place it would not have had the same effect. I shall not put straw on level land again. The effect of this straw mulch is more marked on the young clover that follows than on the wheat. I had some fears that the clover would not start good under it. It started quicker and grew faster every time. The shelter helped it. The difference has usually been very marked. I do not know just how the benefit came to either wheat or clover. There was not enough of the straw to make any protection, one would think, to the wheat, nor had it any value as a fertilizer, as it did not decay. It did shelter the clover slightly, however, at first. I suppose we must say the benefit came from its mulching properties, the same way that clover helps by shading the surface. It wakened me up some on the mulching question when I walked over my field and forty rods away on a hill could see the line where straw was spread by the increased growth of clover, and there was so little straw settled down onto the earth among the plants that you would not see it unless particularly looking for it. But you could see the result without any trouble. You remember my saying in another chapter that you could not place a single straw on the soil and not increase the fertility. You see, I was not guessing at this. Decaying vegetable matter on the surface tends to increase fertility. Don't burn it. Don't sell it for a song. I own my own drill. Yes, I do. I cannot afford not to, although never putting in more than a dozen acres of wheat. Cheaper to hire one, say you? Well, let me tell you a little experience and observation. One fall a neighbor who raises wheat got his potatoes off just about as we did, and then we both went to work fitting our land as rapidly as possible. It was very late, and minutes were precious until the wheat was in. I think my neighbor got his land fitted at about the same hour that we did. As soon as I thought my man could keep ahead of me in the last harrowing and rolling, with one team, changing from one to the other, I hitched my team to the drill. It was all ready, oiled, filled, and set, standing in tool house waiting. It did not take hardly a minute to change from rolling, and then in went the wheat at a steady, but fast gait. The barometer indicated rain, but not a storm. It was not hot and muggy. It was late. The wheat must go in before that rain, anyway. It did, just barely, with not a minute to spare. I did not stop to look around or think till I got done. Then a drizzling rain set in and lasted about two weeks, on and off, and it proved the very best time in the whole season for sowing wheat; better, as it turned out, than earlier.

Before the rain was over my wheat was up and seemed to almost cover the ground. It did not rain hard so as to pack it badly. When I had time to think, I wondered why my neighbor had not got his wheat in. I learned that he depended on hiring a drill, and had to wait a day or two before he could get it, and the result was wheat put in two weeks later—too late, certainly. The probabilities are that he lost enough to pay for a drill in this single year. I am a business farmer. Have money to invest. Am ready and anxious to invest in anything safe that promises a large interest. A good drill ready to hitch right onto the moment I want it is what I must have to always do my best in wheat culture, to put the wheat in when the conditions are just right. Don't you see? Why, I know farmers who own not only a drill in connection with a neighbor, but even a harrow. I not only must have my own, but I must have one for each team, to cut up the ground in a hurry when it is just right.

But now it is a fact that I made money when I did not have as many tools, and that I had to get along without all I wanted once. But as fast as I was able and saw that a tool would pay me in the long run, I invested in it. It is just as much an investment as money in the savings bank, and pays better. I can put my wheat in in twelve hours on a pinch, and all the rest of the year that tool lies idle. But occasionally it is worth five times interest and wear to have it right at hand. I think I lost enough at different times before I got one to have paid entire cost. I have had to farm that way sometimes, but do not propose to when I can as well as not do better. Of course, if these tools were not taken care of it would be a different matter. But of that in another chapter.

I have my own binder also. Worse and worse, you may think. Well, you can do as you please, but I think I know what I am about, and I have no tools to sell, and I paid $125 for the binder. You will, perhaps, think something like this: "There is no need of a man with only twelve acres of wheat owning a binder, surely, even if he does a drill. It doesn't make any difference to a day when wheat is cut, as it might when a crop was put in. He might better hire a binder, or his wheat cut, most certainly." Yes, I thought so, too, and tried it. You are right as far as you go, considering the wheat only. But we raise potatoes, and you must have noticed in previous chapters that it makes a difference when they are cultivated. Let us suppose it to be about harvest time. I have engaged a man to come with his binder and cut my wheat. Tuesday afternoon it rains a nice shower. I get word from the binder man that he will be here Wednesday to begin. Wednesday morning it is just dry enough to go to cultivating when the binder comes. Of course, we must and do attend to the wheat, we must take our turn or be out. It takes all our regular force to set up the wheat nicely. There is some delay from lodged wheat that must be mowed and a couple of days slip by before we can do the cultivating. Should it rain again in a day or two there would be no particular harm done, perhaps, but if it did not rain for weeks as often happens at this season of the year, why we might easily lose enough to pay for a binder by one single delay of this kind on twelve acres of potatoes. We allowed the ground to dry up hard and a crust to form and hundreds of barrels of water to go to waste that we could have used. We cannot afford to do such farming as that, particularly with money seeking investment. However, when I bought the binder I was not very flush ; paid for it with a note for a few months. If I could be sure of getting a binder just the day I wanted it I would not own one, but I found I could not. See how nicely it works if we have our own. That Wednesday we stir the surface in our potato field in time, and Thursday and Friday cut the wheat, which makes no difference with the wheat at all and enables us to do our best in the potato field. Some may say: "This is drawing it too fine. I guess my potatoes or corn can wait a few days in harvest time." Yes, they may and luck may favor you, but this book, you know, is about "Our Farming," and we have depended more on helping ourselves than on luck, on doing our best and then trusting in Providence. Again, there is a sort of a good comfortable feeling of independence and dominion where one has his own tools in the tool house in prime order and ready to hitch onto just when he wants to, that would pay me the interest on their cost if I had the money to spare. For years I hired the use of a fanning mill to clean my seed wheat. But it was no small job to take the wheat to a neighbor's and bring it back, and as soon as I was able I bought a good mill of my own, and now I can clean my wheat in bad weather, as my buildings are all connected.

It is hard to say just what profit there is in wheat culture. The dollars you get when you sell your wheat do not represent the whole matter. You must have a rotation to do the best farming. The wheat comes in as a sort of necessary factor. Potatoes, for example, are my main money crop. I must grow clover to furnish fertility. I can as well as not raise the wheat along with the clover, as a crop to seed with. Again, most farmers need the straw to bed animals. It pays to make them comfortable. It should be done anyway, but it does bring dollars, too. I could not do without my straw. Should have to buy it if I did not raise it, or use something in the place of it. And straw is valuable on most farms as an absorbent. It pays to save liquid manure. And the straw may be fed with grain, if desired, so as to bring about half the price per ton of hay, where stock keeping is a specialty. This is not theoretical ; I have so fed it and got the money more years than one. So matters sort of link in together in such a way that it is hard to say just how much profit there is in the wheat growing. I might figure on it a little on my farm, perhaps, so as to give a fair idea of how it pays me in my rotation with potatoes.

Average cost of growing an acre of wheat after potatoes:

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| Use of land, | $6.00 |
| Harrowing with cutaway and Thomas, | 1.90 |
| Rolling twice, | .50 |
| Seed, | 1.12 |
| Drilling, | .70 |
| Cutting, | 2.40 |
| Drawing into barn, | 1.62 |
| Threshing, | 3.00 |
| Use of barn for storing, | 1.33 |
| Drawing to depot or mill, | .70 |
| | $19.27 |

I have intentionally put these figures full high. I do not want to make out that wheat growing pays me by underestimating the work. I have allowed for going over the ground four times with cutaway, or twice lapping half—once lengthwise, and then crosswise—and for two harrowings with smoothing harrow. After the tearing up, given by the digger, this will be sufficient. The digger pulverizes the drill row a good deal, of course, and the heavy flanges on wheels dig between the rows. Allowance has been made for interest and wear on drill and binder, and for cutting some lodged wheat with a scythe, as we nearly always have to with a heavy crop. The amount charged for cutting, drawing in and threshing will seem excessive to some, but a crop of 30 to 40 bushels per acre is no plaything to handle. And I have charged good, round prices. And I have put in the use of the barn, so much as is necessary to store the grain. There is no plowing, of course, as that was done in the spring, and charged to the potato crop. Now, my dear readers, you can see at a glance that, at the prices of the past few years, we couldn't come out whole, growing 15 or 16 bushels per acre. No, there would have been " depression in agriculture " here surely, if we had tried it, and still this is above the average of our State, you know. Thousands are growing crops that do not begin to pay, if the entire cost of production is fairly figured. Few farmers in Ohio really make any money on wheat now who grow less than 16 or 18 bushels per acre. Of course, with cheaper land and smaller crop, the cost is not as high as with us. But I have never had to figure on a very small crop. I have never grown a single crop that did not pay a good, round profit, after paying myself well for all labor, etc. Our average for all the time we have been in the business is above 30 bushels, take good and poor years right through. Let us see how this shows up. I sold last year, as usual, for seed, but wheat was bringing, when I drew mine away, $1 a bushel, or more, at the mill here. Thirty bushels, at this price, would pay me over 55 per cent. net profit on the cost of production. Doesn't that go a little above the profits of the Standard Oil Co., think you? If sold at eighty cents a bushel, it would show a net profit on those large figures above of more than 25 per cent. And this is for the grain alone. No allowance has been made for the straw. But let that go, as I have made no charge for manure put on the clover, some of which the wheat gets, of course, and it costs something to save and apply it. The best crop of wheat I ever grew, that is, the one that brought the most money, paid me 196 per cent. profit on the above cost of production. That is, for every dollar put into the crop on the above basis, I got almost three back. But this was extreme. I may never do as well again. The average is high enough, and please notice, friends, that this is not fine theory, but what I have done, and you have read what great discouragements we started under. I believe our Ohio farmers can grow 25 bushels of wheat per acre, on the average, just as well as not, if they only do their part. Then wheat growing will pay, and as well as most legitimate lines of business. Then, with other crops in proportion, agriculture will boom. I have done, and will do, all I can to bring about this much-to-be-desired state of affairs. It has come on my farm and more, and on not a few others.

In speaking of spreading straw on wheat, I failed to say that it must be spread very evenly and carefully, or, at least, to emphasize that point. It is no small job to do it. We draw it on when frozen, and throw off of load in forkfuls along, about what it will take, and then spread with a fork. I have known men to draw on, and spread right after drilling, and let the wheat come up through it. We are too busy then. But there is an advantage then, as the wheat will hold the straw from blowing into bunches. It sometimes blows off badly for us. If we can spread just before a rain, or snow, it helps. On large fields of level land, exposed to wind, it would not be practicable to spread straw. It would not be for us, perhaps, only we can do it in the winter, when work is not pressing. It is quite a job. We ought to have a machine to spread straw by the load. Thousands of stacks might then be put back on the land, instead of standing and rotting down, and sometimes being burned, or being sold very cheaply.

I prefer to cut my wheat when the berries have just gone out of the dough state, but are not quite hard. I can cut them in two with my thumb nail, but they cut dry and white. It is just as well for the grain, I think, to stand until dead ripe, only one can not set up the wheat as well. The heads turn over and straw becomes stiff and the bundles are loose and bulky. In this condition it is hard to set up so as to shed rain. Before now, when I have had some get very ripe and in this bulky condition, I have put it right in the barn without setting up at all. If there are no weeds in it, or grass, not even in the butts, and the straw is entirely dry when bound, it keeps all right. Lodged wheat, however, put right in in this way heats too much. I put in some because it was so hard to set up, but would not do it again. Dead ripe, clean, standing wheat may be put right in the barn safely. Otherwise I like to have it out three or four days, more or less, according to the weather. Wheat cut in the dough and put in the mow before it is entirely hard will harden up just as well as though left standing out doors. I have tried it more than once to avoid getting it wet. But my wheat seldom has any grass or weeds in it. Wheat that stands out some time and gets very dry will make less dust in threshing than if put in damp, so the straw gets more or less mouldy. This is an important matter where one threshes in the barn and keeps his straw in. Well put up, wheat will stand through a good deal of bad weather without damage, but still variety has something to do with this. I prefer not to make bundles very tight. A rather loose bundle, not over large, will dry out if it gets wet through by a driving storm. A very large, tight-bound one will not. We put about ten bundles in a shock when setting up. A dozen makes most too large a shock to dry out well. We have put in only nine, setting three in a row and two on each side and two for caps. Sometimes nine in the base makes none too large a shock to cover well and cure out. We break the bundles for caps in the middle, taking a few straws at a time, so as to break them squarely down, not just bend them, and put the first cap on with head to south and last with head to west. Our strong winds are most likely to be from these directions, and the head will be least likely to catch the wind. It pays in a bad year to take pains and have wheat right before it goes into the barn or stack. One very catching harvest I went through the field and run my hand into every bundle before it went into the barn. The dry ones went in and wet ones were set out, two and two, and dried, and some of the worst were opened and then bound up again. We spent, perhaps, $10 worth of extra time in getting it all dry and knowing that it was. My hand got pretty sore in running it into so many bundles, and I did not particularly think what I was doing it for, only that wheat ought to be dry when it went into the barn, and it is not my nature to slight any job. But when I drew the grain to mill in Akron, and I stood and saw Cummins & Allen buy load after load that was ahead of me in turn at seventy-five cents a bushel, I felt pretty blue. I supposed wheat was worth nearly one dollar. But they said this wheat is all damp and damaged so that we cannot afford to give more. In turn I drove up with mine. Mr. Allen run his hand into it several times as I was unloading, but said nothing at first. When he gave me my ticket to go to office with, it was figured at one dollar a bushel. Of course, I showed it. I would not have been human if I had not, and this raised quite a breeze. But Mr. A. showed them the difference and said he had rather have wheat in the condition mine was in at one dollar than the other at seventy-five cents. Didn't I rejoice then? Half-way work does not pay, friends. Again, I sold Mr. Allen my wheat one year by sample. A peck or so was carried down. He said he would give me ninety-eight cents. It was *perfectly* clean and plump. I started back with the sample and he says: "Hold on; leave that sample here, please." I did. Then we drew down the wheat, two loads a day. The first day he figured it at ninety-eight cents without a word. The next day he handled it considerably as I was unloading and figured it at one dollar and said: "Your wheat comes full up to the sample and is splendid, and we will make it an even dollar. I did not believe you had a lot equal to the sample or I would have said one dollar at first." Didn't I feel paid for my extra care? And all this was open and above board, right before other farmers standing around who had to take less. Thank God that we have some honorable buyers that will thus encourage a man who is trying to do his best. In 1881 I went to them with a sample of my wheat. They were having a little run that day and were paying $1.50. Mr. A. asked me what I wanted for mine. I told him I wanted to sell the lot, and was entirely satisfied with $1.50. Well, he says, that is more than wheat is worth in New York. We are paying that to-day, but wouldn't like to contract any at that extreme price. Just then his brother came in. He turned to him and asked him if he wanted to contract any wheat at $1.50. "No, sir," he said, and then he looked at the wheat and they tested it and talked some minutes together, and finally told me to bring it along. I did, as fast as I could, but the price dropped, and I felt sorry to have them paying me more than it was worth, and said so. Mr. A. said: "We haven't any too much such wheat as that even at that price." This was a big thing for me, both the large price and the pleasure that came from having my carefulness valued. This was the crop that paid 196 per cent. net on cost of production. I haven't always had as fine wheat as this, of course. When we do our best we will sometimes come out behind. Two years ago a sort of blight struck my best wheat on the low, rich ground, and shrunk it so it was not as good as on poorer land. Very hot weather at the time of ripening sometimes shrinks the berry a little. But on the average our success has been very satisfactory.

The neatest way of drawing in wheat we have found and one we have tried several times is to put two men in the mow, two to drive the two teams and load, and one man to pitch on. Where the wheat is near the barn, this keeps all hands busy steadily. One of the hottest days I ever worked we put twenty loads, of thirty to forty shocks each, in the mow in ten hours in this way. I recognized the fact that the weak place was in the field. A slow pitcher could hold the whole force back. So I took that place.

Then I put a man I could depend on on one wagon, and, of course, the other would not be left much behind. In the mow I thought it wise to guard against careless work, for fear we might run short of room. So I hinted that it was a little hard on the knees to pack wheat *well* and a dollar extra should be paid to the man who mowed away to buy him a new pair of overalls. This had the desired effect. Steadily, drinking a little between each load (water), I sent in the wheat, quietly getting up a little strife as to which got back soon enough to get the largest load, and without injury to myself or any one we did a very large day's work on the hottest day I ever held a fork. Three men and a team will get in about eight loads in a day. There is no chance for push and management. We must have three men, as it takes two on the mow. I have told you this just to give you a hint, that there is a good deal in management. I have put up twenty big loads of hay in a day in precisely the same way and with as much saving. With men as with children, the best management is that which attains the end in a quiet way without their being any the wiser.

# CHAPTER XXVI.

## WHAT IF EVERY ONE SHOULD DO SO?

THE reader cannot help but see that the whole drift of some sixteen chapters before this one has been towards growing larger crops. By draining we are certain of an increased average production, where draining is needed. Tillage helps make more fertility available after we get through draining, and hence we get larger returns from our fields. If we save all our manure instead of wasting half or more, that means more plant food, and if properly used, as has also been urged, larger crops will be the result. Clover growing is to get still more fertility from subsoil and air, to grow more crops. Now, many will say: Suppose every one did all this and by doing their very best in every line managed to grow 200 bushels of potatoes per acre instead of 100, twenty-five to thirty of wheat, instead of thirteen to eighteen, and other crops in proportion, would not prices be so low from the great overproduction that we would not be any better off? It will doubtless surprise some, but almost invariably when the writer has been urging improved methods at our institutes, which would tend to increase our crops and income, the first man to get up would ask the above question. There is a general feeling that overproduction has brought prices too low now, and to grow larger crops would only increase the trouble.

Well, I am entirely ready to admit that if every one should do as above stated, *all at once*, farmers would be no better off. There would not be a demand for the greatly increased supply. But it is just as true that every one will not do this. Perhaps not one reader of this book in 100 will start out to do this thing and stick to it persistently, year after year, until he accomplishes the end sought. The careful study of statistics shows but very slow improvement on the average in yield per acre. It is not likely it will be greatly increased by what one man can say. Again, a great increase cannot be made all at once. The process of bringing up a farm is necessarily slow.

Now, have you not known farmers who, during these years of low prices and overproduction, have grown large crops and made money right along? I have, and I never heard them complain that times were particularly hard. For individual farmers, this way has worked all right in the past. I will admit that if there had been too many of this kind, it would have tended to make matters worse, but I believe there is no possible danger in the future in this direction. Let us look the situation fairly in the face. The great trouble in the past with the price of wheat, corn, beef, etc., has been the enormously increased production from the sudden settling up of the great West, and the advent of machinery that enabled men to handle larger fields of grain than would have been possible by hand labor. The great advance in this direction is over. The best of the land is taken and its first flush of fertility has been largely exhausted. The supply in the future will gradually increase from better methods of farming, and from taking up some new land yet; but probably not quite so fast, on the average, as the demand from increased consumption will call for it. There seems to me every reason to believe that we have touched bottom in prices of farm products, and that we may look for a slight advance, on the average, for the next ten years. It seems really wonderful that we could have worked off the crops from such a greatly increased and fertile area at as fair prices as we have had. It would be more wonderful if we do not now soon have somewhat better prices. There are those better posted than the writer who look for much higher prices soon. But I do not feel at all certain of this; that is, that much higher prices will come to stay. Any great rise in price of wheat, for example, would largely increase production here, and then there is the constantly increasing production of India, South America and Australia to take into account, and freight rates are constantly working down, which helps extend the area to be drawn on. Twenty-five years ago wheat would have had no market value if grown in Dakota, because it would cost more to get it to market than it was worth. Now Dakota pours twenty or thirty million bushels into the world's market each year. The same is true elsewhere, and in other lines. England brings wheat from India through the Suez Canal at a very large decline in freight rates. Texas raised cattle for their hides and tallow, once, but now is running her beef into the great centres, train load after train load.

Certainly it is to be hoped that no great governmental irrigating scheme will be carried through to largely and suddenly increase our crop production in the future, until at least there is more demand for it than at present. When demand here catches up with the supply, and the United States cannot feed her own people, will be time enough for this project to be considered. There has been too much haste in the past about opening up new territory, building railroads, etc.; that is, for the good of the mass of our farmers.

Do not fear in the least, my friends, to do your best in the future and grow twice as much per acre as you are now doing, if possible. You will never be sorry, I will warrant. With many of our farmers this will be a safe way out of the hard times of the past, and it is practically about the only way out. Better business methods on the farm is what we want. They will pay.

They have paid during the dull years lately gone through. Of course, there are wrongs that ought to be corrected by legislation, and will be in time, but in most cases they are slight compared with what the individual farmer can do for himself. We pay more than our share of the taxes, sometimes, but my entire taxes for a year are no more than I have in one season got from the draining of a quarter acre frog pond. One evening last winter at an institute a farmer was going on at a tremendous rate about the great salaries paid county officials. It seemed as though, from his talk, that one thing was holding him down beyond all hope of rising. The Auditor was in the audience and quietly slipped out and returned with the figures showing, if I remember correctly, that all of that farmer's taxes that went in that direction was fourteen cents. Railroads do charge too much when they have no competition, sometimes, as I fear some farmers would. But a great many farmers have no reason to complain. I can send wheat to Cincinnati for six cents a bushel, or potatoes to the East for about thirteen cents a bushel. One cannot complain at these prices. Yesterday I got a new cultivator from Philadelphia, and the freight was only thirty-four cents, and on two it would have been no more. At these prices the railroads are not making as large a percentage of profit, nothing like as my cement stable floor and covered barnyard pay me.

Good farmers are now making a large percentage of profit at present prices. At an institute last winter it was said that the national bank of that place was paying a dividend of 8 to 10 per cent. on its stock, and as a result this stock was selling at a premium of 40 per cent. We have not a few farmers who are doing as well or better than this. But you say the masses are not doing well. This is undoubtedly true. But why not let them slowly work into better methods and make money too, the same as their more progressive brethern? Is there any reason in the world why the individual reading this book cannot, with profit to himself, do this? Don't worry too much about the mass, but save one man at a time. Organization will help, help to get our rights in numerous ways, and is a grand, good thing, but it can never in justice raise the price of farm products, nor can it without regard to justice, for there are too many farmers to ever hold together. When by good methods twenty-five bushels of wheat can be raised per acre and pays a fair profit, no ten-bushels-per-acre man has a moral right to demand that wheat be held for a price that will pay him a fair profit. This is not the way other business men think of doing. In my town during the time I have been farming nearly every business man has failed. Some sunk fortunes, and many thousands of dollars of other people's money. Why is it that eight or nine out of every ten business men fail sooner or later? Largely the same trouble that the mass of farmers have, competition. A few make money, the mass fail.

There is one great difference between the farmer and other business men—he is forever telling of his troubles and belittling his business, while other business men say nothing.

Ex-Governor Hoard says if his business of publishing a paper will not pay it is not the fault of the business, but because Hoard is not big enough to run it. Would that we were all as honest. It is sometimes said that the great mass of farmers must go on as they are now doing and must have relief from some other quarter, from legislation, or something. This is a taking doctrine with some audiences. The speaker will be cheered and made much of. Why not have some special legislation for these nine business men out of ten that fail? My friends, I would like to encourage you to look for help in this direction if I thought there was much chance, but it is precious little you will ever get in any such way. Success awaits you, but largely in another direction. My friend, Hon. John A. Woodward, of Pennsylvania, put it in this way at an institute once: "The farmer who does what his hand findeth to do with his might, does more for his personal advantage than all the organization and legislation in the world can do for him." Each one work for your personal advantage, and the masses will in time be all right. This book is certainly written with the hope that it may encourage a good many individuals to greater and more businesslike efforts, and the writer feels entirely certain that excellent results would come from it if every single reader should, as fast as possible, work up to as high a standard of farming as has been laid down herein.

We have a good many farmers who are in debt badly, and no money to drain with or to get tools, perhaps, for better tillage, or to employ labor to do anything like as well as they know how. I am very sorry for them. Some things I have said may seem harsh to them. But the business is not to blame because individuals are so situated that they cannot run it so as to make it pay. No other business on earth could possibly pay under the same circumstances. We have no moral right to demand that farming done under such disadvantages should bring paying returns. It never will. We must work our way up in some way. With everything against one it is a slow job, but you can hardly read the first chapters of this book without seeing that it can be done in time. Where there is a determined will there is a possible way. If I could see any easier road than the hard one we traveled, I would most gladly point it out to you. But I cannot, and it is more than useless to delude you with false hopes, although it might be a more popular doctrine. Competition is here, and we have got to meet it. We cannot shut out Dakota or Texas or any other section. We must meet competition as other business men do, by reducing the cost of production.

I was talking with a well-known manufacturer in this county not long since, and as he is an old friend, I asked him how they were getting along now. They have great competition to meet. He said, "We have not sold as many machines this year as last, but we have introduced improved methods of manufacture, so that we have made them cheaper, and can thus show as large profits as ever." A friend of mine has a lumber yard in an Ohio city. Last fall he stopped here on his way to Cincinnati to get improved machinery for planing mill. Competition drove him to getting the very best and latest in the line of labor saving. Last winter I stood in his shop and saw the improved machinery running. Lumber is planed on both sides at once as it goes through the huge machine, that has a capacity of 33,000 feet in ten hours. This can be done at a profit for $1.50 a 1,000. The old planers, where only one side can be planed at once, cannot do the same work and live for less than $2, say nothing of profit. Yes, this machine planes all four sides at once, if you want, or both sides and matches, and many other wonderful things. This is the way manufacturers work to overcome competition. The weak must go to the wall. The pushing man who reduces cost of production in every possible way comes to the front. Survival of the fittest. As long as the work is well done, and the workmen fairly paid, I do not see how we can find any fault with this. When it is carried so far that workmen are not paid fairly, which is more particularly the case where females are employed, and poor goods are worked off as better than they are, or any product is adulterated and sold as pure, then we have a right to object. Still buyers are largely to blame for this, because they buy the cheapest and demand it.

Now, my friends, we must meet competition in our line in the same general way that honorable business men do in other lines, if we want to succeed. When we do we can succeed even at present prices. My friend Woodward, lately spoken of, said the farmer might be pictured as between two walls that were pushing up against him, most too closely of late. One was the cost of production, and the other the price he could get for his products. We cannot push back the last wall very much, except in the way of raising a choice article, better than the ordinary, but we can move the other one, the cost of production, considerably on most farms. This is a legitimate and honorable way up, too, and practically the only way. For example, look at my potato growing. I have in mind a friend who plants two or three acres a year in the old way. Plowing out the furrows with a horse and plow, while his son leads the horse, dropping seed by hand, covering by hand, hoeing by hand. He works hard and faithfully, and still on soil that is not tile-drained much and needs it badly. One year with another, he doesn't get paid any more than fair wages for the time spent. With drained land, machinery, clover rotation, not too much to do, long rows, bushel boxes, etc., etc., we have so reduced the cost of production that we get paid for our labor, and a very large profit besides. We have done this in and of ourselves. It has not taken any organization or legislation to accomplish it. And nothing of the kind will ever make the other farmer's work in this line profitable again. He is behind the times. He can work his way up to us or beyond by better methods and practices only. Thus he can reduce the cost of production so that there will be a fine profit in the business. One hundred bushels per acre is a large average crop for Ohio. This yield, as ordinarily grown, costs just about what it sells for, when you count seed, all labor, use of land, etc. This is "agricultural depression." But suppose by better methods, such as using three horses instead of two, with one driver, machinery to plant, harrow to save hoeing, long rows to save time, one-eye seed to save money at start, machinery to dig, boxes to handle, etc., you reduce the cost of producing a crop some ten dollars per acre; and then you grow twice as many per acre by thorough draining, manure saving, clover growing, level culture, fine, unsprouted seed, etc., and get 200 bushels per acre. Can't you see that there may be more than 100 per cent. clear profit in the business? Sometimes it will do much better even than this. This is the way out of agricultural depression in this particular line.

If you keep cows, say five or six, and they make 150 pounds of butter a year apiece, that is agricultural depression, particularly if sold at ten or fifteen cents a pound, as thousands do in Ohio. If you make a business of producing butter, test your cows and work off the poor ones, using only thoroughbred sires of a butter breed, and feed properly and get some 300 pounds of butter per cow per year, and have conveniences to make the best, as you can afford, if you make a business of it, and get twenty to thirty cents a pound the year round, as some do, this is the way out of agricultural depression in this line. The road has been traveled and is now well known. Will you start out on it?

So it is in all lines of farming. I can take you to men who are making money in any line you may select—doing it now, with present low prices—and the only way out in the future for us that I can see is the same road they have traveled. Work in every way you can to raise larger crops, more bushels per acre, more pounds of better butter per cow, larger pigs at a given age, and more of them if you want to, and work as systematically to produce this result at a less cost of production than the ordinary, and you will be all right. One year a friend said to the writer, "Well, I guess you won't make much this year; potatoes are going to be so low." My answer was, "I have twice as many to sell as I have ever had before." I was all right.

Now, should every reader of this book double his yield, or bring it up to the highest practical figures, it would not make much difference with the world's prices. It is a big world. But it would make a great difference in the prosperity of the readers.

That is what I want to make plain. If you think what little you can grow will be felt in the markets (it will not any more than a drop of water in Lake Erie), why grow the same number of bushels you do now on half the ground. This will bring the same result in a smaller way, and would be a safer plan, if every one went into it. I am writing for *you*, dear reader. Only here and there one will I reach. Could I induce many thousands more to do their best, I still think it would be entirely safe and that demand would keep up to the supply.

# CHAPTER XXVII.

## SOWING CLOVER, TIMOTHY AND HUNGARIAN GRASS SEED.

OUR clover seed has always been sown early, and during all these twenty-three years we have never had a failure. What I mean is, we have never failed to get a reasonable "catch." Of course, it is better some years than others. One spring, when I was sick, a neighbor came and sowed for me and I set the machine as I used it, and he took much longer steps than I and only got out a little more than half enough seed; but it was a fair stand—even, but thin. The right time to sow here is about the last of February or first of March. Some years it is two weeks earlier than others. The conditions are about right usually for two or three mornings. When the snow is about gone and it begins to warm up and thaw considerably daytimes and freeze quite sharply at night, throwing up the then moist surface of the earth in a way that is injurious to wheat, then, the very first morning of this kind, I am out sowing my clover seed. The earth heaves up more at the very beginning of such weather, as the surface is more moist, usually. My drained land soon becomes settled, and if it freezes later it does not honeycomb so much. I like a still morning, and a frosty one will be likely to be still from daylight till 8 o'clock, still enough for sowing clover seed. However, I can and have sown clover seed and Hungarian when the wind blew so I could hardly keep a straw hat on, and had it even, too. I mean just what I say. A year ago I was only home one morning from the institutes, and this happened to be a good morning, only the wind came up before I got half through and blew almost a gale. But it was exactly south, and I was sowing north and south, the long way of my lots. It will not do to sow in a strong side wind, but one can in a head wind, if it blows at all steady. If it came in puffs I should be afraid of it. Well, the seed sown that morning was so evenly distributed that there is not a square foot that has not a good stand on it. There is not, nor was not, a sign of a streak. I never had a streak in any sowing I ever did. It was hard on the eyes facing the wind, that was all. I looked for a day or two as though I had been on a spree. A pair of dust glasses would help in such a case. I have pulled my straw hat down over my face, putting it on my face instead of top of head, and then made a little bit of a hole in it to look through. Going with the wind, I put it back on my head. I remember once sowing a piece of Hungarian for a man some twenty years ago, just before a storm, when it was blowing a gale. It was quite a ways from home and he was inclined to object; said no man could sow evenly in that wind. I did not want to come for nothing and I knew what I could do, and so told him if after I got through he could put his hand down on the field anywhere and not find seed under it I would make no charges. I got my pay and the piece came up all right. Of course, this was machine work. I use the Cahoon and have for twenty-three years—the same one, too. When I first got it I used to sow half of the seed lengthwise of a field and other half crosswise to insure an even stand. This was a waste of time. For many years I have sown all one way. But now to go back : I want a clear morning as well as a still one, so the sun will thaw the surface and fasten the seed in the mud at once, where it will not be moved by heavy rains. I want to sow early, at the very beginning of such weather as indicated, so the freezing and thawing following will thoroughly work the seed into the ground. I do not believe it is possible to cover it in any practicable way any better than Nature will do it. But now the common notion has been that clover seed sown early, would germinate when some warm days came and afterwards freeze, if we had a sharp frost. I know it will, under certain conditions, and that it will not ever (in twenty-three years) on my farm when conditions are right. Sow later, when the ground is quite settled, and warm weather will sprout the seed on the surface and the roots will be more or less bare. You have seen it so. The seed lies on the ground and roots are growing out and trying to get into the soil, or have got in partly. I will warrant a hard frost to kill it when in this condition. Sow early enough, so freezing and thawing and rain covers the seed in the soil, and it will not sprout so quickly when a warm spell comes, and if it does, the seed and roots, being in the soil, the plant will stand it. I have had the ground freeze time and again so as to hold up a team, without injury to my young clover. We had a terribly bad spring this year and my clover was up through it all and is all right. I have seen failure after failure, right in my town, from sowing later than I do, from just the reason given. Again, I have known some to wait and harrow the wheat and then sow, and a dry time coming on just after clover came up, they lost their seeding, while mine sown early pulled through. It had got its roots down to moisture. I have known farmers to sow a week or so after I did and then lose their seed. The reason was simply because I sowed with conditions just right, on honeycombed surface, and the seed was promptly covered by thawing, while they waited just a little, but long enough for surface to settle, and their seed sprouted on top while mine was down in. This is no guess work, friends ; I have stuck pins down side of plants and watched the effect of frost.

Sowing Twelve Acres before Breakfast.

I sow six or seven quarts of common clover seed per acre, when sown alone. Less gives a very good stand, but not always thick enough. It is not wise, however, to get it too thick. I prefer a moderate stand of strong, healthy plants, rather than an overcrowded stand of more puny ones. Many sow by hand, yet. This is not wise. Seed sowers cost but little and do much better and faster work. I do not like the wheelbarrow seeder or those that run with a bow. Those like the Cahoon, that run by turning a crank, are the best. They throw a continuous stream of seed. The bow machines do not, and under all circumstances are not as good. Some morning when you get almost done, with your wheelbarrow machine, you must stop on account of mud on wheel. I can go right on with my machine and finish. When I bought mine I paid $10. They are only about $5 now. I sow clover seed and Hungarian about twenty-one feet wide, unless in a high wind; a little narrower then. One can get over the ground in a hurry. Getting up at daylight, I often sow my twelve acres before I stop for breakfast. It is a hard job to hurry so, but conditions are just right and it must go in. I can well afford to rest the remainder of the day, if I get it in well. I do not use stakes at all, but follow the drill rows of wheat. To do good work, of course one must walk and turn at a uniform, steady gait. Machine should be kept well oiled with good caster oil. Use coal oil occasionally to cut the gum. Seed should be entirely clean, no sticks or strings or anything in it to stop steady flow of seed. If wind is such that you must sow otherwise than with drill marks, pitch forks make good stakes, if it is not frozen too solidly. Tie a strip of white cotton cloth on top. If frozen hard, use stakes set in pieces of board about fifteen-inches square. Just bore a hole in the centre of board and drive in the stake. My son, when quite a small boy, thought of this one morning when I found it impossible to stick in a fork, and quickly had some made for me. When you first get a machine, practice with it a little beforehand without any seed in. Always have seeder oiled up right beforehand and everything ready to start at daylight, so as to get seed in when it is just right. Some years this time is short. If sowing more than twenty acres, I would have help and more than one seeder. The gain might pay for half a dozen in a single year, or even a good deal more.

I sow timothy seed about sixteen feet wide. For this I want a perfectly still morning, if possible. I have never sown the two seeds mixed, as some do. Clover being heavier will be thrown further. How many times I have seen a field where they had been sown together and the timothy was in streaks—failed to reach as far as the clover! Go over the field twice, once with each kind of seed, if you sow both, and then you should be able to do a perfect job. With a good machine it does not take long.

But now, when shall we sow timothy? That depends on what you want. If you want timothy hay, with a little clover in it, and timothy hay be the yield of wheat made more or less, sow in the fall when you put in wheat (for this section) every time. That is the safest and best time for the good of the timothy. But your clover will not stand as good a chance. When you sow the clover seed in the spring you are sowing on a wheat and timothy sod. It has a very poor chance—not anything like an even race with the timothy. Again, often in this latitude, wheat is injured some during the winter, and the timothy starts first in the spring and crowds the wheat all the season, and the farmer is at a loss whether to cut the field for wheat or hay. I have seen thousands of acres in this condition. Now, that was good for the timothy, but often took five or ten bushels from the wheat yield. This is hardly business. At any rate, it did not suit me, for I have been there, both in the raising of timothy wheat and timothy clover. My first step towards something better was to sow the timothy about two weeks after I did my wheat, say near October 1st. This was a little better for clover and wheat, but not as safe for timothy. Next, I went further and sowed both timothy and clover in the spring. The timothy was sown early, same as the clover. This was much better for me, for what I wanted. The timothy could not injure the wheat. The clover had an even chance with the timothy, and being the rankest grower, usually came out ahead. I had clover hay with more or less timothy in it. This makes good hay, easier cured than clear clover, and the crop stands up better. If hay was an important crop with me I should still do this way. This gave me more fertilizing effect from the clover than I had had before. But late years I am getting more yet, I believe, by sowing only clover seed. This evolution has been a gradual one, as I have felt my way along and been governed by results. Timothy comes in some years in my clover; but I have not sown any lately.

I think that in the above, many who read this book will be able to see why they have not got much returns from growing clover. I remember how one writer said some years ago when I was urging the sowing of more clover seed: "Why we all sow clover. Farmers do not think around here of seeding down without sowing in some clover seed in the spring. But we do not see any particular results from it as a fertilizer." No, and there is a good reason why. They do not grow much clover. It does not have much chance as ordinarily managed around here, neither at the start nor later. I have made a good deal out of it the way I manage. In fact, this book would never have been written, and you would never have heard of the writer, if it hadn't been for clover. I do not advise on this point at all, as our circumstances differ, but I have told you just what I have done and the results and why I did it. Now, you can study out what is best for you to do on your farm.

In regard to use of seed-sower, I do not measure the distance at ends, but pace off seven paces for clover and five and one-half for timothy. It is well, however, for one to examine the seed on the ground before deciding just how wide to sow. Difference in speed and weight or plumpness of seed will make a difference in the cast. I have a large tin pail, holding about seven gallons, that I empty my seed into from the bags, and have a quart dipper in it. Then, beforehand, I estimate how much land I will sow in once passing through field and back. I measure seed into the machine, and when I get back, can tell just how much per acre I have put on, and change to put on more or less, as need be. Then, afterwards, I can measure in just a little more than enough to go down and back each time. A little skill will save one from carrying an unnecessary amount of seed. It is hard enough work without carrying a pound more than one wants. If a field was very long, it might pay to have seed at each end. In sowing Hungarian or millet seed, I would do this on my farm, as it takes much more per acre.

I raised a good many tons of Hungarian when keeping stock. It makes good hay and is an excellent crop to precede wheat. It used to pay me far better than raising oats, and then it is a good crop to put on the sod. If I kept stock now and did not want to raise corn and potatoes on my clover sod, I could grow Hungarian nicely, and then seed to clover again with wheat. As a feed, it has seemed to me fully equal to timothy hay for cows. Horses did not like it as well. It must be cut in bloom to make the best hay. There are several good reasons for liking this crop. It can be put in later than oats. That is one great objection to oats, that one is apt to work the ground too early for them before it is dry enough. In this latitude, Hungarian should not be put in before last of May or first of June. (I have put it in as late as July 4.) Then the soil is apt to be settled and dry, and the thorough tillage which is needed does much good. It grows very quickly. Fifty-five or sixty days from sowing, if it gets a good start and is not sown too early before weather gets warm, it is ready to cut. Then there is plenty of time to prepare the ground properly for wheat. It is not a difficult crop to cure. On good land it will yield three tons per acre, easily. For myself, I prefer the Hungarian to the other varieties of millet.

The soil should be very finely pulverized for Hungarian. The seeds are small. No crop needs a more thorough preparation in order to do well. I used to roll and harrow alternately until the land was about as fine as it could be got. Of course, this must be done when quite dry or it would do harm. When dry, you can hardly overdo in preparing for Hungarian. I have raised a good deal of it, and always had good success, and the secret you now have. My next neighbor once wanted me to put a piece of four or five acres in on shares for him. I declined, but offered to hire the land for cash and put it in and have the crop. He rented it to me. And I worked it until he found fault. Said I would wear the land all out. Well, I got a tremendous crop. I cannot say exactly now, but I think it brought me some $70 an acre. Hay was high that winter. I have no doubt I got double what he would with the tillage he was in the habit of giving. Mr. Charles Harlow, another neighbor, wanted me to put in a piece on his farm on shares once, some twenty years ago. I wanted two-thirds of crop if I did all the work and furnished seed and put his in barn. He said he could get it put in for half, but one-third of what I grew would be more than half of what he would get if he let anyone else put it in. So I got the job. Thorough preparation was the entire secret of my success.

When the land was ready to sow, I would harrow last with smoothing harrow, thus leaving little drill marks for the seed to fall into. Then I would sow three pecks or rather less per acre, and if ground was reasonably moist, simply passing over with roller was all that was needed to cover it. I have, when dry, harrowed before rolling with Thomas smoothing harrow. But the soil must, and should be, packed very firm or this will put seeds too deep. Now comes a critical time. If the weather is warm and soil moist, and it comes up and gets started nicely before a heavy rain, all right. If there comes a heavy rain on this fine, firm, rolled seed bed, and soil is at all heavy, it may bake so it will not come up good. In an extreme case of this kind I would harrow up and sow over. This is one reason why I said do not sow till late. You want warm weather to bring it right up. It is a warm weather plant, anyway. Sown early it would be slower coming and more risk. After it once gets started it will stand dry, hot weather well, or rain either, on drained land. Possibly on clay soil it might be better to cover with harrow and not roll, unless one was quite sure of dry weather.

Many cure Hungarian too much. I have had best success to do about as follows: Cut in the afternoon, let it lie until, say, 2 P. M. next day, if light, or until 9 or 10 second day, if very heavy; then rake and cock up, about 100 pounds in a cock. These may be drawn in the next day or day after without opening, if cocked up warm with no dew or rain on, and it is warm when it is drawn in. I generally cut in the afternoon, and did nothing to it next day, and cocked up the third and drew in the fourth. Have put up twenty large, solid loads from the cock in this way in a day, with two teams and drivers, one pitcher and two on stack (before we got a big barn). A word about curing timothy and clover when raised together. If there is a good proportion of clover, as I should try to have if growing hay to feed out myself, I would cut when the clover was in full bloom, or very soon afterwards, taking what timothy there was. The timothy would gain by standing a little longer, but the clover would lose. Cut it off while it is all good and get another crop started, if you want more hay. We are fast finding out the difference between dried grass and hay. I used to mow my first crop and get another nearly or quite ready to cut when some were doing their "haying." How they laughed at me then, but now they most all do it. It is seldom that I am the first one to start. I should cut timothy for cattle when in full bloom, same as clover. For driving horses it is well to leave it till the bloom falls entirely. Some horses will drive well on clover or timothy cut in full bloom, with grain. To others it is most too loosening and softening.

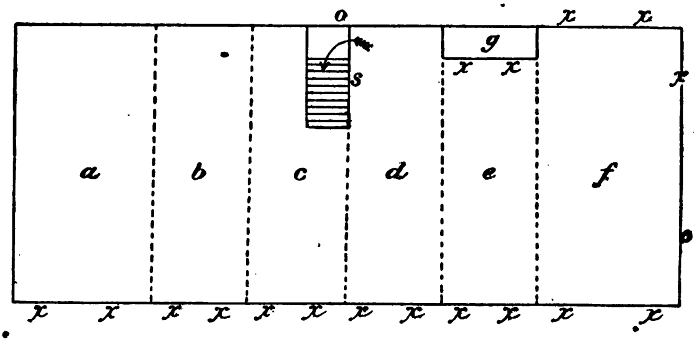
# CHAPTER XXVIII.

## CARE OF IMPLEMENTS.

YOU could hardly read previous chapters without noticing that I believe in having all the tools that will save one hand labor. I believe it is the most profitable way to farm to-day, to do enough to amount to something in whatever lines you undertake, and then do as little work by hand as possible, whenever we have machinery that can practicably be employed, and that does the work as well. It has been said that this is taking the work away from the poor men who need it. There is no trouble that way here. Men seem to soon accommodate themselves to circumstances. Fifteen years ago, I could hire a man to cradle my wheat for fifty cents an acre, and help was very plenty to drop potatoes or dig and pick them up. Now that machinery does nearly all this, the men seem to be busy at something else and don't want to do this kind of work any more. They have easier jobs. But for machinery I would be in serious shape for want of help, and so would thousands of farmers. I find it very difficult to hire any men by the day. I tried pretty hard last night to find someone. They get work around town that is easier, or they don't want to soil themselves any more. I engaged a young man last spring to help me a few weeks this summer, during the busiest season. He came and told me just before I wanted him that he wouldn't work on a farm, as he could make as much peddling washing machines, and of course that is lighter work, and he can wear a laundried collar and cuffs. There are no poor men with us seeking for farm work, and I am thankful that I am able to be somewhat independent of such help.

Farmers in different sections have remarked that it would sink them to own as many tools as I do. They honestly think so, no doubt. I know that I can afford to own them. I do not farm blindly, without using pencil and head considerably. They can afford to own as many as I, with the conditions the same. One very important condition is, the care given to the implements. I can take you to farms even in Ohio, where the finest new implements have stood out doors the year round, and gone to ruin in three years. I know that a great many good binders stood out doors last winter, in different States, for I saw them. Tools are better cared for here than in many sections. There are not very many left out all winter here, but the loss from unnecessary exposure during the summer is enormous in the aggregate. It is more than the necessary wear. Yes, I believe it to be a good deal more. There are farmers in this county, plenty of them, and good farmers, too, who lose more than fifty dollars every season in this way, on tools, wagons, etc. They will own it, too, when one talks with them. One of the best farmers in town was looking at my covered yard once, and I was telling him what a nice place it was to run tools under when you was through using them, so as to not leave them out doors at all when not in use. I said to him, "Now honestly, how much do you suppose your tools and wagons depreciated in value last season from exposure, when not in actual use?" He replied, after a moment, "Sixty dollars at least, and possibly one hundred." He has a large stock, and this is, no doubt, a correct estimate. When a man has gone on a few years in this way, and perhaps left some implements out all winter, as Southern and Western farmers are quite apt to do, I do not wonder he thinks keeping up such a stock of implements as I do would sink him. Unless he is making money unusually fast, there is no doubt of it. But this does not prove that, with proper care, a good supply of tools would not pay.

Let me illustrate this more particularly. I bought the first manure spreader that came into these parts, and one of the first made. It has always given us good satisfaction. It draws easily. I would not take to-day five dollars less than the price of a new one for it. If you ever come here, look and see if I am not telling the truth when I say it has been so well kept that it looks almost as new as the day it came out of the shop. When I have told visitors how many years it had been used they have said: "Well, you have just got it painted new." Not at all. It is the same paint that was put on before it came. It is practically a new machine to-day. It is good for a lifetime of wear, as I use it, and more. It has never been out in a rain or dew or in the sun one hour, except when in actual use. This is the secret. But now a number of spreaders were bought in this section soon after I got mine. I do not know of but one that is in working order to-day or that has not been used for several years. Now this is a fact and worthy of consideration. These tools have gone to pieces or become horse killers in a short time. One man said, after using one a year or two, that when he wanted to kill his horses he would take them out and shoot them, not hitch them onto that thing. Costly machinery is not advisable under such circumstances. If men prefer to use much muscle instead of a little care, it is their privilege, but the other way will usually be the best. The spreader, of all tools, will give out the quickest when left exposed to rain and sun. The floor or table, if swelled in the the least, will bind and be a horse killer or refuse to go at all. When mine came it was on a flat car and got rained on. When I got it home it would not run. After drying out under cover it went all right and it has never been wet since. I hope this may let a little light into the matter of affording tools. Let me give another illustration: When I came onto the farm, a very good land roller was being manufactured here, or had been for two or three years. It was the best roller made and has never been equaled since, as far as work done is concerned. But it was costly and complicated. I bought one the year I came here. Many were sold in this locality. For a time they could be seen at work or standing around, on many farms. Gradually they went to the fence corners or were sold for old iron, having given out. I do not remember seeing more than one during the last ten years. It would be safe to say that their average working life was not more than ten years, and still they were made of white oak and iron mostly. I used mine twenty-two years. Last year it began to show old age decidedly and must be repaired or replaced. Iron rollers are now so cheap I thought it as well to buy a new one, and got a Superior. I don't want to brag, but this is the difference between—but I am not going to say anything against my neighbors. But this I shall confess, that I was about as careless as they at first. We were very short of barn room and my roller was kept in the summer when not in use under a very thick, leafy tree, which shaded it well. In the winter we managed to put it in under cover usually. Yes, this is the truth. But I got to thinking and figuring after a time and that sort of work was stopped. Had I cared for that roller from the first as well as I did the last fifteen years it would be practically almost as good as new to-day. I had learned common sense before the spreader came around, or that might have gone to the fence corner or rubbish heap. But I said we were very short of barn room at first and gave that as an excuse for not caring for roller better. It was a poor excuse. When I saw the waste, and thought, I found a way to stop it, as little barn room as we had. Instead of a four-foot door in the end of a stable only used winters, we put in a ten-foot one and run our tools all in a stable that was about 10x40 feet. It was terribly unhandy having the door in the end so, but best we could do. What we wanted was always at the back end and numerous tools must be run out to get it. But we took care of them. And it was a very unhandy place to get them in. I often had to go and get wife and children to help put things up or get them out. We could not then afford anything better, nor could we afford to leave things out doors. Still, under such circumstances, we could not always put them up as soon as we were done using them. They might have to stand out several hours until the day's work was over and I had help to put them up. The plan was an improvement and the best a poor man could then do, but not perfect. The endless bother we experienced was made lighter by thoughts of something better to come, and we studied and figured on the easiest and most perfect and cheap plan of taking care of implements. What we wanted was to get arranged so it was just as easy to care for things as not to, and that is just where we now are. In pursuance of this plan, we first built a tool and carriage house. I wanted these things in a building by themselves, where they could be kept clean. And I wanted it handy. No more moving out ten things to get one. And I wanted it so I could put things up or get them out alone. I had tried the hard way first. How glad am I that I did not build before I had experience and knew just what I wanted. Here is the plan of this building. You see, it is long and narrow like my old stable, but the *doors are on the side.* And the entire side is door, for that matter. The letter *x* is placed where each door is. The building is 22 x 56 feet. This just answers our purpose, protects everything and no waste room. When our things are piled in here they are very snug and compact. A little more room would not be unhandy, say ten feet longer, but I was ashamed to build any larger on a fifty-acre farm. This building has twelve-foot posts (see picture engraved from photograph in next chapter), a third pitch roof and a second floor over the spaces *a*, *b*, *c*, *d* and *e* to give storage overhead. You will notice the stairway at *s*. This floor is about seven feet above the ground floor, except over *e*, where it is raised a little higher, so as to take in any top carriage below. There is no floor over *f*. The doors at each end of *f*, are nearly twelve feet high, so you can drive through with a load of hay or any other high, bulky load; *f* is a gangway to the covered yard in the rear. The spaces *a*, *b*, *c*, *d* and *e* have only doors in front for storage of buggies and tools. In front are seven posts set on stones and held in place by iron dowels. We simply bored an inch hole in the bottom of the post and drove in a piece of inch iron rod, say six inches, leaving it projecting two inches. Then drilled an inch hole in the stone two inches deep and raised the post and put dowel in place. The stones only come just above the surface, so they are not in the way. Then between these posts are doors, a pair to each space. The



Ground Plan of Tool House.

spaces are of different widths, you notice, to accommodate implements of different sizes: *a* is just wide enough so we can back in our little binder, and then hay rake and six-foot mower go in front of it; *b*, *c*, *d* and *e* are each eight feet. In *b* we put manure spreader, roller, grain drill, etc., all tools requiring about seven-foot-in-the-clear doors to go through readily. In *c* we keep a double row of narrow tools like the potato digger and planter and also harrows, cutaway, disc, etc. It is so arranged that we can pack a large number of implements into these three spaces. In the winter they are all in there except what may be upstairs. Light tools, like plows, cultivators, Breed's weeder, etc., are kept above. They are easily taken onto the upper floor from the space *f*, anything that is too bulky to go up stairs. In *d* and *e* we keep carriages. Of course, one in each place would be the handiest, and we do not often need to have more, as a buggy can stand in *f* or on the barn floor, which is 13 x 45. But two buggies can be put in each place; *d* is high enough for an ordinary top-buggy, *e* is extra high. My wife's little pony, canopy-top phaeton generally occupies *d*—is there to-day. The family canopy-top surrey is in *e*, the open run-around is in *f* and the piano-box, leather-top, narrow seat (just right for my son and his girl) is on the barn floor. During haying and harvesting it will come down and double up with the ladies' phaeton. The lumber wagons are usually kept on the barn floor or in the covered barnyard; always on barn floor in winter. The carriage harnesses are kept in cupboard *g* at the rear of space *e*, where they are shut in away from dust, nice and clean. We have two single harnesses in there and our best double harness is kept elsewhere at present. We intend to extend the cupboard across the rear of space *d* soon. Work harnesses are hung along the right hand side of space *f*, right next to the door *x* which leads into the horse stable. Notice the convenience of having horse stable right there and still shut off by itself.

If you have read to here you have waded through many dry details. Let me tell a good little joke on my wife, brought to mind by thinking of the tool house, just for a rest. I have always meant she should have a horse and buggy for her special use some time, but didn't get around to it until a year ago last spring. Then I bought her the neatest little, low-down ladies' phaeton that I could find. She can step right in and out so easy! And she—well, she hasn't grown very poor, farming. Robert and I managed to get it home without her mistrusting, for a wonder, and after we had it all set up and dusted and put in the best possible light to show off, Robert went in and asked his mother to come out and help us move some tools, pa wanted her. She came, and as she entered the tool house door she was saying: "I thought you had been writing in the papers that you had your tool house arranged"—(so you could handle tools yourself)—just then her eye fell on the little phaeton and her remark was never finished, and she looked as though she was awful sorry she ever began it. Still she was right; one's practice should always be up to his preaching. We had fooled her completely, once. But don't you dream that she hasn't done the writer up as badly.

All these doors in the tool house are fastened on the inside except one. The natural place of entrance as we go from the house is near the centre of the tool house, so one door in space *d* is fastened inside and the other has a large latch on so it can readily be opened from either side, and this is our regular place of entrance in going to the stable in the main barn to the right.

I have not said anything about it, but you have probably inferred that we have a ground floor in the tool house. We have, and I think it is the best. Of course, it costs nothing, while a wooden floor with joists and planks would be quite expensive. But the matter of convenience was of more importance to us. It is so much less trouble to get things in and out, with a ground floor. To prevent water from running in, the floor is raised slightly above the surface outside, say six inches, with a slope some ten feet long to make this little rise in. Practically, this does not bother at all about getting tools in. I back the binder in with the team; other tools are readily put in by hand. Again, the ground floor is better for buggies and most tools, as the air does not get so dry as with a plank floor raised from the ground. There is no tendency to shrinkage of woodwork in the hottest weather, but there is one slight drawback. In the spring, with a sudden thaw, a great change of temperature, the tools, etc., will be damp a few hours, and without care, iron will rust some. This may occur two or three times. Also, the ground floor becomes dusty after a time. Where tools are, it makes no difference; in fact, it hardly gets much so there; but where the buggies are, there is so much tramping that it is quite dusty. I have to hitch up before putting on my best shoes, or they would not look freshly blacked. We have tried sprinkling, but the effect does not last long. A floor of clean gravel would be less dusty, but not as pleasant to walk on. Ours is of clay. It would be just perfect if we had a cement floor about three inches deep all over. Quite likely we may put this in at some future time. Do not think it is not very good as it is, but I thought best to give the slight drawbacks that we had found to the earth floor. I should build just the same again, by all means. Except where there are doors, the tool house has underpinning all around, so it is tight. The boards run up and down and are well battened, so no snow or rain drives in. The doors come within about two or three inches of the gravel which forms the entrance and approach. They cannot come closer, as the gravel rises with the frost in the winter nearly two inches. To prevent snow from driving under these doors in the winter, we put straw along against them inside, and lay boards

Mrs. Terry in Her Phaeton on the Lawn.

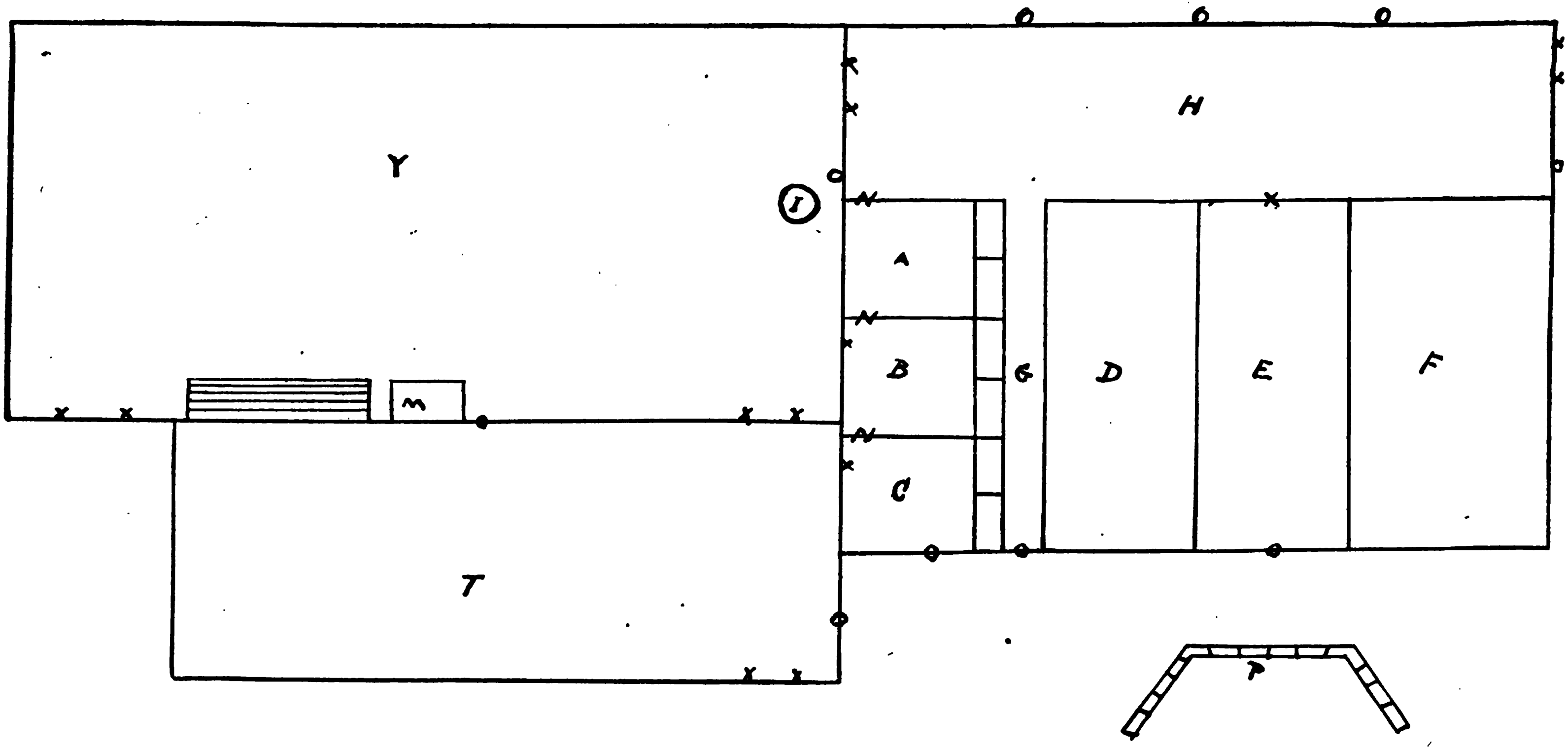
on it; where the tools or buggies are we do not use. One pair of doors, of course, must be left to get sleigh out and in, or buggy. The doors are hung with hinges entirely. There would be no chance for sliding doors, nor would they be as tight. Ours are as tight as doors in the house. I do not believe in half-way work in this line. One often sees tool houses or sheds open on one side, so sun and rain and snow can drive in freely. They may be better than nothing, but are far from perfect. We have two windows below in the tool house. In the plan they are marked *o*. One is on the end and the other, on the back side, opens into the covered barnyard. We prefer to not have much light in there. When we want light where the tools are, we open a door. Our tool house cost $400, all lumber and timber and underpinning and labor paid for, and painting included. It could be built so as to protect the tools for less money, but we have a good cornice on it and it is a nicely finished job all through. Eave troughs carry away water from roof, and the upstair floor is of good, matched flooring, etc., etc. One-half of the tool house is used for storing tools when not in use, but it would not be convenient to put them up so compactly there every night. Temporarily, we need other shelter, and we have it arranged in the handiest manner we could study up. Reference will be made to this point in the next chapter, after you get the plan of all our buildings before you. Here seems to be a good place to say something about lending farm tools. Even as few as I had when we began farming, they did more work away from home than for me. Borrowing was a common practice. I had a new plow, and when I got my little plowing done, a farmer wanted to "try that make of plow." After using it more than I had, he said he didn't like it, and returned it without even a new point. If he had liked it, I could have stood it better, although it didn't make a particle of difference to me financially. I had a good roller, and that was wanted at once in all directions. In those days I never said no—was rather young and green. One farmer, living at a distance, was fairer than the rest. He said: "Now, you hurry through with your rolling; your land can be worked earlier than mine, and I will give you $5 a year for the use of your roller." That $5 was quite an object then. I did hurry through and he got the roller, and when I wanted it I had to go after it, and he sort of carelessly informed me later that he didn't use it much after all, and never paid me one cent. Neighbors reported differently, even saying that he used it in working on the road and charged the town for it. But I did not investigate the matter and let it go. Again, I lent the roller to a farmer before I had used it. When I got ready to roll in a crop of Hungarian grass, I met him and told him I wanted to use the roller next day. He replied: "I guess you won't, for it is broken down and it will take some time to get it fixed." So my crop was not rolled in, and that of a farmer very much better off was, and with my roller. He was man enough to put it in good repair, but this was not always done when it was broken. At last, I began to think I was loving my neighbors better than myself; not a bad thing to do, but you know that "he that provideth not for his own is worse than an infidel," and I wasn't able to provide for my family nearly as well as were these friends, who were wearing out my tools, and perhaps preventing me from getting the benefit of them. In time, I made a rule that under any ordinary circumstances my tools would stay at home until my own crops were in or tended to, and politely informed friends to that effect. When I got a manure spreader, men came here to try to get it at once, men more able to buy than I, and one man told me I was mean to not lend it. Well, he had always got manure out by hand, but all of a sudden machinery was necessary—if he could borrow it—if practically he could get part of his work done at my expense for nothing. As he had much more money than I, I felt that the meanness (?) was justifiable. One cannot afford to lend such tools as a roller, spreader, planter, digger, binder, etc., and have them go distances over the road and be left out doors for days, or perhaps used by someone who doesn't understand them and damage done. For myself I do not want to hire them out either. I can better afford to keep them in perfect order for my own use. I have pleasantly explained this to people for the last dozen years, and now have no trouble. Of course, I wouldn't be really mean. If a neighbor broke down and had a lot of men waiting and wanted some tool temporarily, I would do as I would be done by. A poor man would be quite apt to get anything he wanted with some one to go with it perhaps. I think my neighbors understand my position and think none the less of me for it. We like good tools in perfect order and where we can put our hands on them the moment they are wanted, and we want to keep them from exposure, which cannot be done when they are constantly being lent. With the exception of a horse rake the first year we were on the place, I do not know as we have ever borrowed any costly implement. We have gone without until we could buy. For two or three years we exchanged the use of planter for that of a grain drill, but soon procured a drill of our own. Two neighbors own a planter together with the agreement that neither shall lend it unless he goes with it. This seems to work pretty well. But I prefer to own my own, and my not making a practice of lending or hiring them out is one reason why I can afford to, and can afford all that will save me hand labor.

One is often urged in the papers to keep his implements painted. I have never done this or seen the need of it except in the case of wagons. As we care for tools the original paint lasts. Wagons are more exposed and should be painted often. We paint them ourselves, getting some good ready prepared paint. The cost of washing them up and giving a good coat of paint is very small. We do it after harvest usually, when there is a little lull in regular work. With this painting, and shelter when not in use, our two wagons are nearly as good as new after some twenty years' use.

# CHAPTER XXIX.

## OUR BARN.

IN previous chapters we have had a good deal to say about our tool house, covered barnyard, etc.; we will now take the barn as a whole. There is a good deal in so connecting and arranging buildings that they will be very convenient. We have ours so fixed that they suit us very well. Take a good look at ground plan on next page, and pictures on pages 255 and 257, then you will be ready for the description. We will take the ground plan first. T is the tool and carriage room that was fully explained in last chapter. To the right stands the main barn, 45 x 60. Back of the tool house is the covered yard Y. This extends fourteen feet beyond the tool house, so as to give an entrance from the front. There are two doors here, about twelve feet high, like common barn doors, large enough to drive through with a load of hay or grain, if one wished to. Notice the double doors (X stands for door all through plan) in right end of tool house. They are the same size as those opening into covered yard. This makes it easy to get into yard and out, as one can go in either way and out the other, when drawing manure or simply driving under to leave tools over night. There is plenty of room in Y to have a good many tools standing around temporarily, without being in the way, in the summer, when no stock are in the yard. Now, perhaps you are ready to see how it is just as easy for us to care for tools and wagons as not. Nearly everything is on wheels now. Just make a rule that tools shall be brought up at night. It is little or no trouble; usually easier than to leave them in the field, as one can ride. Then have a nice lawn in front of barn as we do, all nicely cut with lawn mower every week, and let no one unhitch from anything out there, but just drive in. It is just as easy. The doors stand open, usually; if not, they must be open for the team to go in. Then your tool or wagon is under cover. Notice the horse stable, right at the end of yard, and tool house, with doors directly in from each place. How handy to let horses go right in there after unhitching, and hang the harness just outside between X and O on end of tool house. And then in the morning you can hitch on and go ahead out, all as easy as not. As I am fixed, I do not deserve much credit for taking care of tools, do I? Well, I got tired of being greatly bothered to take care of things, and I could not afford not to, and so worked to get things handy.



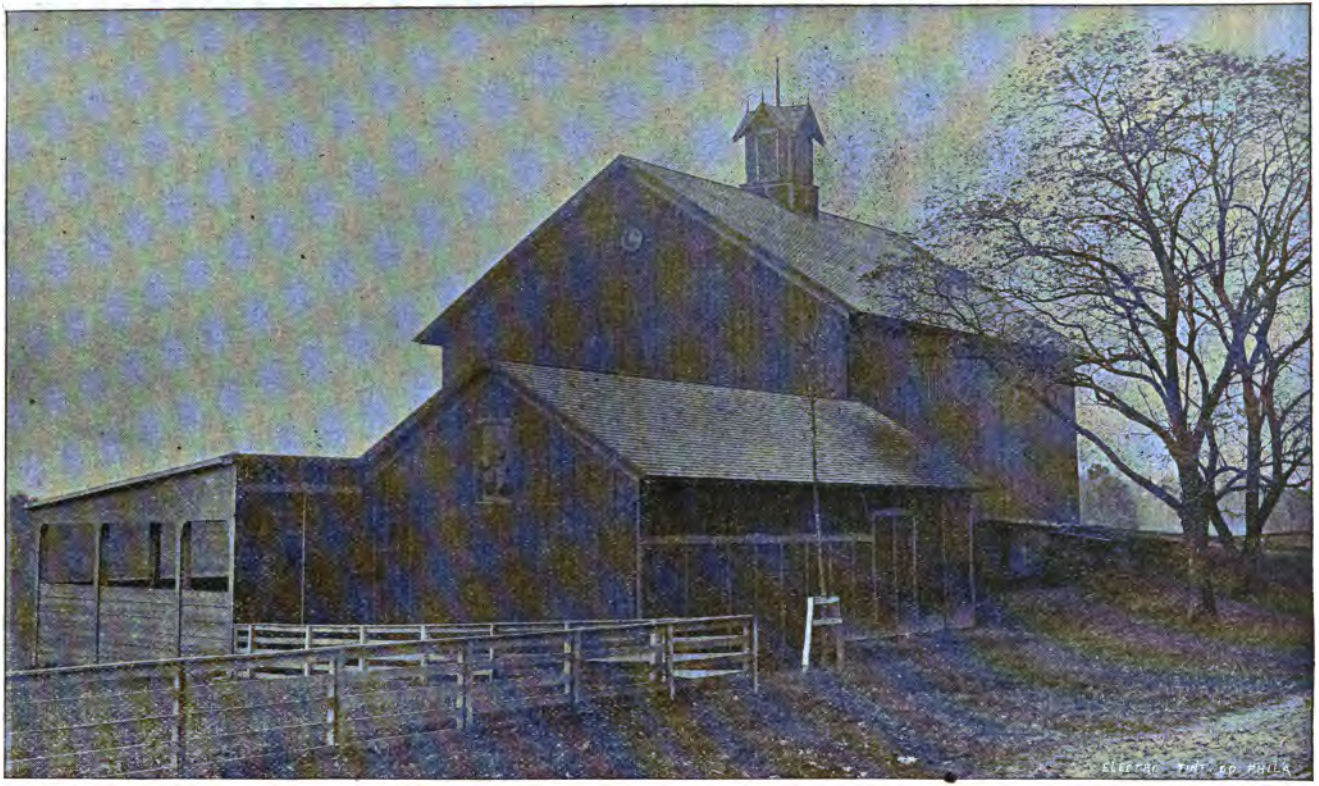
Ground Plan of Tool House, Barn, Covered Yard and Lawn.

When we are putting in a crop in the spring, you will find under that great roof, plows, cutaway harrow and disc, and Thomas smoothing harrow, the roller, potato planter, wagons, potato boxes, etc. When the crop is all in, these are stored away in their place in the tool house. Just now in harvest time, if you had come along, you would have found the binder, mower, hay rake, wagons with racks on, etc., standing around, well protected, but not put up. In the winter, of course everything is put away and the yard clear for stock to exercise in. There is in the yard now a hundred loads or so of manure. It is not in the way at all of using it for tools temporarily, as the manure is leveled off so one can drive right through as though it was not there, and there is straw enough on top to keep it dry and clean. Remember, the yard is lower than the entrances, made so with a gradual grade. With two hundred loads of manure in, it could still answer this double purpose just as well. I tell you, we are well fixed to care for manure and tools, and the saving will pay a tremendous interest on the cost, too. I wish every one had things in as good shape. But I fear many do not realize how much they are losing by not having, and wouldn't value these things as we do. I think I could find you a good many farmers who are loaning money for one-third what it might be made to bring them on their own farms in this and other ways.

We have water in the yard at I. M is an earth closet for the men built on the same plan as the one you will find described in Chapter XXXVI. To the left of the earth closet we have a rack on the back side of tool house, some twelve feet high for storing different kinds of lumber. (See picture in Chapter XVIII.) There are no old board piles, even, outside around our barn. Nor is there a single thing in sight that could be objectionable to the eye of the most refined lady. Everything of that kind is inside and hidden from view. You may go all around the barn and it is simply a neat building, or set of buildings, surrounded by a green lawn on three sides. The rear is in the field. This yard is planked up some seven feet high, as you will see in the pictures, and then open above to let in sun and air on the south and east sides. The front of barn is very nearly north.

When we drive into tool house with buggy, notice how handy it is to let the horse go to his stable. If stock are in the yard there is a door from the tool house directly in, as well as one from the yard. A, B, C are box-stalls in which we can tie two horses, or leave one loose. There are heavy gates or doors (N) from one to the other. The partitions and these gates are only about five feet high, except between their heads at the mangers, where they run up higher to prevent them from quarreling when eating. G is the feeding alley; O windows. I like plenty of light in a stable. H would make a nice stable for fifteen or eighteen cows, but we use it for storing potatoes when we dig, and in the winter let the cow and two horses have it, making temporary box-stalls by swinging gates around. I do not particularly recommend my barn. It would suit few; but is exactly right for our business. E is a granary or cellar. It is built of hollow bricks; is entirely rat proof and very handy. When we thresh, one man can empty grain down trap door from threshing floor above. Or if arrangements were made to pay threshers by weight when grain was sold, it could run right down itself. With granaries outside, farmers have to have three or four men to bag grain and move it. But we sell our wheat soon. I do not think it would keep as well in this room as in a building outside. After the wheat is sold, potatoes are stored in this room (E), which is thirteen feet by thirty. We can put about 2000 bushels of potatoes in H and E in a hurry, when digging, and then the covered yard makes a fine place to take them out in as sacked and load, weigh, etc. Failing to sell our wheat in time and wanting to use E for potatoes, we have bagged the grain and stacked a car load out in covered yard on planks, wheeling it out, as it is level right around. Notice double doors at each end of H. We can drive through with a team to get grain or potatoes from E. D and F are the bays for hay and grain. They come down to basement floor. F is seventeen feet wide, D is thirteen. We have room enough, but are sorry we did not make barn four feet longer and make D also seventeen feet wide. With this exception we would build the same again.

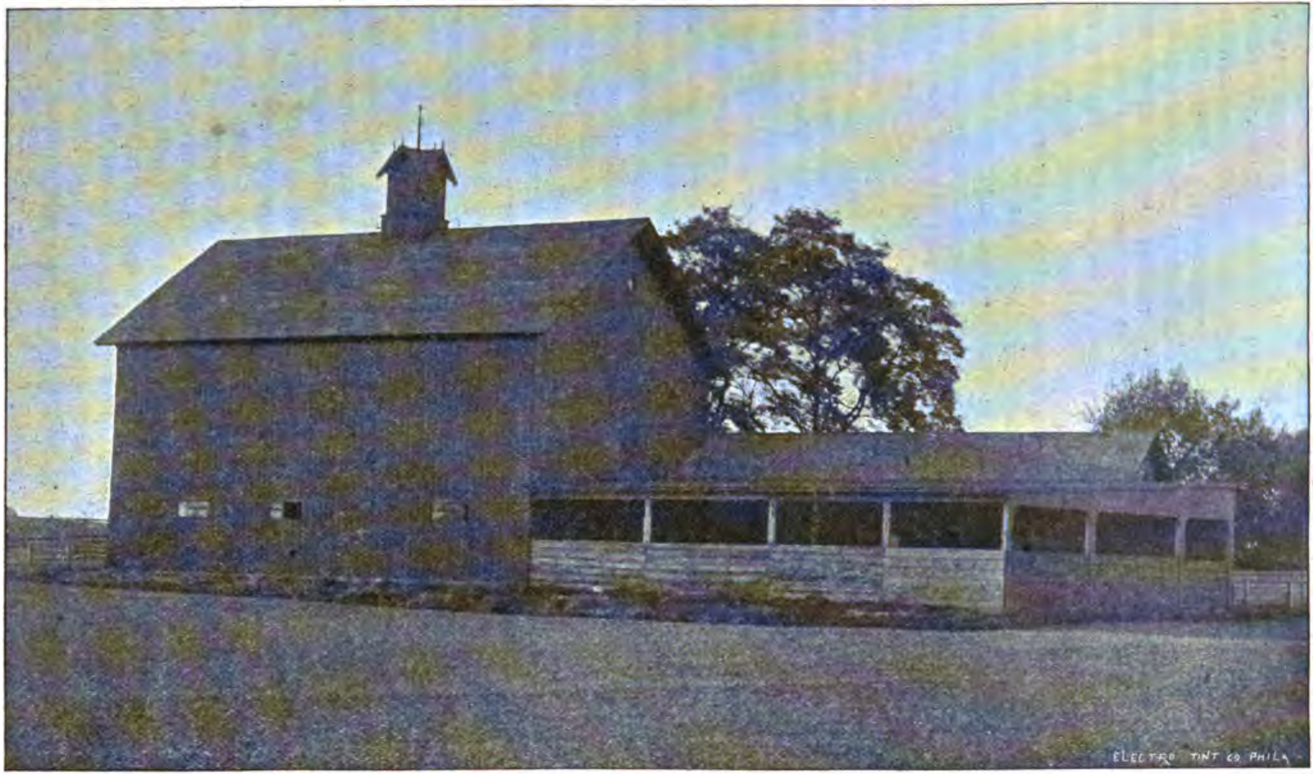
When we drive in on barn floor above E, it is fourteen feet from the hay rack to bottom of bays. The basement story is ten feet high, or a little over nine in the clear. We can tumble twenty or thirty loads of hay into these bays very quickly. Thirty loads are about what we use. The rest goes back to the land directly for potatoes. Then we put the wheat on top of hay. We have no horse fork, nor do we need it with this arrangement. It is no trouble to pitch the grain up as high as we need to. With twenty feet of hay in when we begin, the wheat will press it down to ten. We can fill these bays nearly forty feet deep, but thirty usually holds our crops. Few people with low barns have any idea how much can be put in a bay 16 x 30 feet, say, and forty feet deep. The hay and grain settle and settle, if built up so as not to rest on girts or beams, until a man wonders where in the world it has gone to. But he will find it all there when he comes to get it out. We can put ninety loads of hay and grain into our two bays as built, and large loads too. We have never had this much, but filled one full once to see how much it would take. It takes an extra man to fill clear to the top with grain. If we needed to crowd it we should put in an elevator to draw up the whole load on the rack to top of barn, when it could be readily pitched off. These are now used considerably. I advise, by all means, that you build barns big up and down. The posts of our main barn are twenty feet above floor. If building a larger



Front View of Tool House, Barn and Covered Yard.

barn I would make them twenty-two or even twenty-four. Our barn being so wide, forty-five feet, and having a one-third pitch roof, it is pretty high to the peak, forty-five feet above basement floor. The front of basement runs into the ground a little, three or four feet, then a wall of stones was laid eight feet away (P), and a bridge was built over to barn floor. This makes the basement drier than if front side was all under ground and gives a chance for windows on this side. We have one in front of E, you will notice, which we could not have without the bank and bridge, and E would not answer our purpose without light and ventilation. This way is cheaper, as one can then put a light wall under barn. Our wall under tool house and barn is of hollow brick, only eight inches thick, just the thickness of sills ; no projecting stones or room wasted inside.

Again, the great weight of hay and grain being on the ground floor, the barn can be built much lighter. Our largest timbers are 8 x 8, sills, plates and posts. The bays D and F are boarded up right down to the heavy floor on which they rest, which is raised a little from the earth. Up stairs, the barn floor over E is thirteen feet wide, just enough and no waste room, and continues on over H and the horse stable. Then when we thresh, the straw is put over these stables. Our way of getting it there is simple. The beams in barn are sixteen feet above floor. A plank floor is laid on these beams over H, five feet wide, from the centre bent to the next one each way, just right so the separator when placed will deliver straw on top of the planks. Two light men on these planks will push it off at the ends. Of course, it mostly goes to the east. Two or three men can mow it away there the same as they would stack it out doors. When we get through, the straw is all under cover and right where we want it—over the stables. The planks that we slide straw on are planed so as to make it slip easy. If we lack room for all, some can be put over hay on one bay, the one that wheat was threshed from first. We put a couple of loads of hay in H when drawing in, always, so as to have some to feed from until the threshing is done. We have five chutes for throwing down hay and straw. Those for straw, of course, have to go to top of barn. One chute for straw is over centre box-stall, the other over centre of H. A ladder to get up on barn floor goes up one of the hay chutes. The hay is pressed down by weight of wheat so most of it is thrown directly out into feeding alley through doors. No windows in main barn up stairs except the round ones in gables. Light and air injure hay. It is only just light enough so we can see to get around when doors are shut. Our barn when shut up is quite tight. To give ventilation when threshing or drawing in crops, we have doors about 3 x 5 feet in each bent just under the eaves, both rear and front, and one in the end, and then a large ventilator on top. This is about 6 x 8 feet, and has a pair of good house window blinds on each side. These



Rear View of Main Barn and Covered Yard.

are painted and stuck so the slats cannot be opened and there are no windows behind. To ventilate, we throw the blinds open. When shut, no water to speak of drives in. This cupola works nicely so fixed. It cost $50. Simple, practical, ornamental, but not extravagant. We get up to it by means of an extension ladder from the barn floor.

The outside of main barn is covered with ship-lapped and coved 12-inch wide boards, running up and down. The doors are of 6-inch flooring matched, and are tighter; were easier to put on and cost $4 a thousand less. I would be inclined to cover entire barn with narrow stuff again. We found it a big job to put on 12-inch boards so high up, and spring them up tight always. The lumber is pine, and I shellacked every knot *myself* before the boards went up, and the paint has never started on *one*. And I put the priming coat of paint on the lumber before it was used. It was much easier done. And then it was done before it got wet, every time. The cost of main barn was over $1,400, all labor except mine, and lumber and everything counted. A carpenter offered to do it by the job for $1,300, but I hired him by the day, and had everything done on honor and just as I wanted it. Probably the entire cost of buildings as they stand, thoroughly painted, and all the little contrivances that we have added, have cost us, including a fair price for my supervision, near $2,500. We keep it insured for $2,000, and would much sooner lose $500 than see it burn. We take every precaution against fire. I employ no man who smokes or chews tobacco (and, of course, do not use it myself), keep door onto barn floor always locked so no tramp could get in there to sleep (a combination lock that cannot be picked—one of the Miller keyless locks), use only lard-oil lanterns, and never take these into the main barn. They can be hung outside so as to shine in. We hang one over the window at the water tub in barnyard. If it should be broken there, by a tub of water, a dumb man should be able to put out the fire that could catch from a lard-oil lantern. We use the common railroad lanterns. All this is a little trouble, but it is our place to keep the powder dry before we trust in Providence. I was surprised when I looked over the list of causes of fires in a great insurance company's office, to see how many barns burned from coal-oil lanterns. I avoid that risk for $1 a year for lard oil and a little extra trouble.

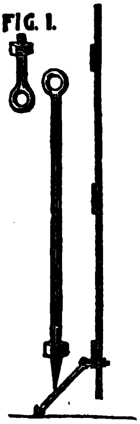
For roofing material, we decided on using shingles on the main barn and tool house. The barnyard roof being so flat, is covered with tin. Perhaps you think I am a little behind in not using slates. I think not. We bought the very best shingles, which will, I think, last on a one-third pitch roof for twenty-five years. They cost me less than slates, and the roof was built lighter and cheaper. I figure the difference in cost put at interest will re-shingle roof when it is needed, or nearly so. But that is not all. We have a slate roof on house, and would again, as it makes the cistern water nicer, but they are constantly cracking or blowing off. I had a slater put on twenty-eight new ones not long since. You must not have anyone fooling on a slate roof; in fact, it should never be gone on at all. And it is far warmer under a slate roof when the sun shines. For this reason alone I would not have a slate roof on my barn. It is too warm to mow away under.

We find it a great convenience having our barn buildings altogether in this way. There is no running from one to another. When we get inside in the winter everything is there under the one set of roofs. I know men who have their horse barn, tool house and cattle barn, each a separate building, and granary, too, and some distance apart. This is not handy, certainly, but in case of fire they might not lose but the one building. I know no other advantage. They keep insured, probably, the same as I do. If I burned out it would be a total loss of everything—more to be rebuilt, that is all. But the chances of a barn burning being not one in five hundred on the average, and probably not one in a thousand, as I manage, I will keep well insured, and take the risk of a serious fire when I have one. As it costs less than two and one-half cents a day to insure me $4,700 on barn and contents, I cannot afford to waste my time by having buildings apart, not if I could thus take my own risk and save all insurance. Life is too short to have things unhandy.

My barn was built exactly as we wanted for our business of raising potatoes and wheat, and keeping our horses and cow; but as one never knows when he may want to change, or sell out to someone who would want to keep stock, the barn was planned with this in view. By simply adding an 18-foot bent on the west end of main barn, or a lean-to of that width, we would have a long stable in the rear 78 feet long, and another on the west end 18 x 30 for box-stalls for calves, bull, pigs, etc., and a silo could be built nicely in front of the addition. Thus we could readily change, growing ensilage corn instead of potatoes, and keep twenty-five, thirty, or more Jerseys in the most comfortable shape. The stables are lined with 1½-inch matched flooring on the inside of girts, and even the doors are lined up half way, so it never freezes in the basement. The long stable is on the south side, with large windows to let in sunshine, a perfect place for cattle. A little expense would turn the barn into model quarters for a winter dairy of twenty cows. In case I kept cattle, I should put a small door into feeding alley in H from the covered barnyard. Now we go in through one of the large doors. The entrance to barn floor from the bridge is through a small door in the large one (about 2 x 6½ feet), and on this is the combination lock. The natural place for us to enter barn from our house is through tool house. We have a gravel walk from house to tool house door. If keeping stock was our leading business, we should cut our second crop clover, probably, and make into hay, and after threshing it could be put in the bays where the wheat had been. I wish you could see my horses in the winter, when they are not used much, and are let out to drink. That dry yard to roll, and run, and kick up in, is something they never fail to make use of. And what a nice place to let out a few cows at once! They may give as much milk kept in the stable all winter and watered there, but their offsprings would certainly be more healthy for their going out twice a day for water and a little exercise in fresh air, but protected from wind and storm, and I believe the cows would enjoy it. From my plan of tool house in last chapter, you might get the idea it was divided where the dotted lines are by partitions. It is not. It is all one room. Those dotted lines are simply to show where posts are and width of doors. The chutes for throwing down hay and straw act as ventilators for the basement. With a barn full of animals more might be needed. As it is, we cover part of the holes in cold weather. The windows in the stables are up high, and slide open to let in fresh air (see picture of rear of barn). The one under the covered yard is seldom shut, only in very cold weather.

You know how much trouble comes from having barn doors on the slam. Well, I made up my mind when I got a good barn there would be a way fixed to fasten all doors open, as well as shut. After several years' use (five to eight), every door is still as good as new. It pays, and life is too short to run after a stick to hold a door open, and it don't always hold it then. We have iron braces on each door of tool house (ground floor), about two feet long, three-eighths round iron rods, with an eye in upper end, through which a staple goes to fasten it to the door through the lower batten. The other end of this rod is sharp, so it will stick into ice or frozen earth. Then, to prevent its going in too far when ground is soft, we had a large nut shrunk onto each rod, about three inches from the point. When not in use, they are laid up in a little hook on inside of door. You can drop it out with your toe, as you open the door, and the door will stay as far open as it goes, every time. The "stick" is always there and cannot slip at either end. The heavier barn doors are held open by larger rods (five-eighths), that hook into holes in the bridge. These have never once got loose in the wind. All other doors have hooks and staples to fasten them open, even all those under the covered yard, and the entire cost all around was not over $3—less than it would cost to replace one broken door. I am a great fellow for insurance. It is door insurance this time. I am afraid you will not notice, if I do not tell you, that we take care of everything. A man may make money and not get ahead, if he lets everything go to ruin around him, three times as fast as there is any need of. There are times in the year when we cannot make anything on the farm; then we try and make something by taking care of what we have. We oil the harness, paint the wagons, varnish the carriages, the wheels at least, paint the inside of eave troughs and the valleys, and the house and barn also get a coat often. It is cheaper to paint before they really need it. It is cheaper to never let anything get really out of order.

FIG. 1.



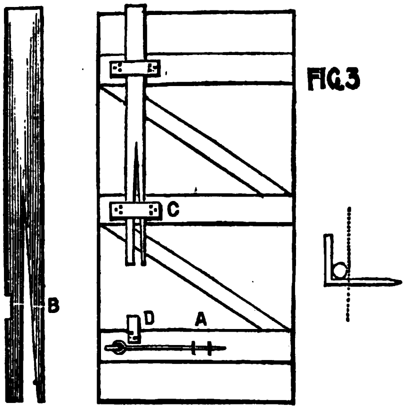
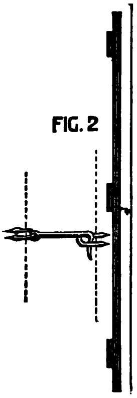


FIG. 3

FIG. 2



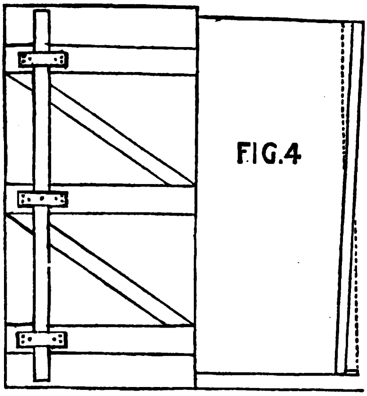


FIG. 4

We have some very simple and good home-made fastenings for the inside of our tool house and barn doors, that were given in *The Practical Farmer* some time ago. I will ask them to insert them in this chapter. A view of the inside of our covered yard, from a photograph, showing earth closet, lumber rack, manner of supporting roof, etc., was given in Chapter XVIII.

In these figures, shown on preceding page, Fig. 1 is the brace for fastening open, attached to the door and separate. I have shown an eye bolt instead of staple. It is better; does not pull out. Fig. 2 shows a common hook and staples for holding doors open, where they swing around against the building, as in the covered yard. We cannot fix those on tool house this way, as we may want several open at once, and the front is all doors. In Fig. 3 you see the little brace, as laid up when not in use; the hook that holds it, shown on the side. The fastening at the top in Fig. 3 explains itself. Take hold at the lower end and squeeze together slightly and pull down, and the notch B no longer holds the fastening up. When shut, it is held in place by the spring of the wood. Ash lumber is, perhaps, best to make it of. The sliding-bar is 4 x 1 inches. We have fifteen doors fastened in this way, ranging in size from seven feet high to twelve. Ordinarily, we fasten them at the top, but when we do not have occasion to use them much, or when stock can rub against them, we have a little bar of wood for each pair, that lies on top of lower cross-piece, behind D, Fig. 3. This bar is always on one door ready for use, by simply sliding it along. Remember, these are doors on a ground floor with no sill to fasten to, and where we do not want a post in the way. When a door, one of a pair, shuts against a sill, a fastening may be used, where one motion of the hand will fasten it top and bottom. Such a fastening is shown in Fig. 4. We have it on five doors. It is simple and cheap. The bar on the door is pivoted on a bolt through the centre. A touch of the hand moves it its width, and throws the two ends behind blocks on sill and beam, and holds the door shut, and moving back four inches opens it. Of course, these fastenings are for doors in pairs. We have fourteen doors that are held open by braces, as shown; nine are held by hooks. The door from the tool house into stable is a sliding one, as it would not be handy to hang one there on hinges. All the doors on barn are hung with large T hinges, such as are sold by the pound, ready made. We put three on a door and they hold them perfectly, even the fourteen-foot barn-floor doors.

It has occurred to me that some one may want to know how steep to make the grade of driveway onto barn floor. It was quite a question to me, and I went and measured a hill that I could draw a heavy load up. A rise of one foot in ten is what I have, and when dry (as it always is when hay and wheat are going in), my horses can draw in 3,000 pounds of load readily and we have drawn in 4,000 of wheat. Our barn is built on the road and this puts it back just about right to give a nice lawn in front, as we have to have about sixty feet to make the rise from the road track.

# CHAPTER XXX.

## THE CARE OF STOCK.

AS several years of our farming were devoted to the care of stock, that being our main source of income, at least one chapter should be given to this subject. Considering the chances we had, we certainly were quite successful in this line. And I would be willing to leave this to the animals we cared for, too, to decide. We wintered the cows of my old friend, Samuel Wright (long since gone to his rest), for several years in succession. As soon as the first bad weather came in the fall, they had to watch carefully or those cows would get out and come to my place, some three miles away. They never offered to do this in the summer. One stormy Sunday, about the last of November, I think, I did my chores in the barn, leaving the stable door open, as was also the yard gate. I was sitting by the fire, when in came Samuel Wright. After talking a while he said: "My cows gave me the slip this morning and I followed them all the way over here and they are all quietly standing in their old places in your stable." I was surprised enough and went out and there they were, and there they staid for the winter. I tell you, friends, I felt as though this verdict of even a cow jury in my favor was no small matter. Mr. and Mrs. Wright were very kind to their cows, but they hadn't the chance to care for them in the winter that I had, and the cows knew it and appreciated the difference. Here they were always fed regularly and with a nearly perfect ration. If straw or marsh hay was fed, enough oil meal or wheat bran or both, was put with it to make it all right. They were watered regularly with freshly pumped well water, pure and nice. I always tended to it myself that every cow had all she wanted. If she was exceedingly, yes, provokingly, slow sometimes about drinking, no matter; it was my business to see that she drank and to have patience to match the case, and I did. The cows were always bosses in my barn, unless I could boss by coaxing. No, I never used a club or whip to enforce my authority. I can say that truthfully, and I would have been ashamed to, nor could I afford to. I will admit that I have now and then taken hold of a cow and pushed her head down in the water when she was provokingly slow about drinking, but even that was foolishness. To be really successful with animals, cows in particular, one needs to be very patient. Any one who is not so, or cannot school himself to it, has no business with them. He cannot make a great success of the business.

Instead of driving them into the stable with a whip, as I know many do, I used to put a little bran in the mangers *always*, and the moment I went to the door and called they came on a run, and one almost needed a whip to keep them out. I let in one at a time and as soon as she had taken her place, the door was opened just enough to admit another, and they would go by me kicking up their heels. A contented animal will gain faster than an uneasy, unsatisfied one. Blows and unkind treatment, besides being cruel, cost one money every time. And then these cows always had a dry, comfortable bed, and it never froze in the stable. The usual winter temperature was near 50°. Their life was as regular and systematic as clockwork, and they were always comfortable. I did not have any covered yard then, but they were never out in the yard only long enough to drink, and a few at a time at that, so that if it was cold it no more than made them appreciate the comfort within. They knew nothing about standing in a cold wind, humping up their backs for hours at a time. If we were having a very bad storm that would wet them, water was given them inside. Now, do you wonder those cows came to me with the first snowstorm if they were not watched?

One winter I fed a stable full of steers of my own raising. They were mostly coming three years old. They were choice animals, all of them, that one could take delight in caring for. I could not then afford large stock of such quality, but bought the little calves of William Ellsworth, who had about the finest stock in town, paying about $5 a head for them, such as he did not want to raise, and really I had better have paid $10 than raise the calves from common stock. Well, I sold these steers about the first of February to the late M. Chapman, another man who prided himself on his fine stock, and he was one of the best feeders in town. I was to keep the stock until April, and they were to be weighed and paid for then by the pound. He told me, in answer to a question, that I might feed them just as high and well as I pleased, and I detected a smile on his face and knew he was thinking: "Why, bless you, young fellow, you cannot take care of cattle as well as I with my long experience! You may do your best, and then they will come to my place and do better!" My reason for asking him was that I knew cattle I bought from a man who only fed them fairly well, did better for me than those that had been unduly pushed like the single cow of some town man. And I knew I had sold fine animals to a farmer who failed to care for them as well as I, and they run down fast. But after his consent was given, with the smile thrown in, I went to work with a will. They were fed what grain each one could safely eat (I knew them all) some four or five times a day, and then a wisp of dried grass to each one, and then the manger was swept clean while they dropped down and chewed their cuds. A clock was in the barn, actually, and they were always fed to a minute and watered also. It is a fact that I could go through there some ten minutes before feeding time with a pail of grain and they would none of them get up. Ten minutes later they would all get up. I have done this before witnesses who couldn't believe it possible until they had seen it. But one had to be very careful about letting them see a stranger, or they might all jump up, anyway. Well, when Mr. Chapman took those cattle home he was exceedingly proud of them. And well he might be. No show stock were ever curried and handled with more care. By the time they got to town to be weighed they began to feel their oats and freedom and they were beautiful to look at with their perfect health and spirits. Mr. Chapman did not want to take them home until grass came, but the bargain was for the first of April, and my hay was getting low and I wanted to get at my spring work. For months I had been tied up with those steers and my other stock, never once leaving them for more than an hour or two by day. The season was backward and Mr. Chapman was obliged to put them in the barn and feed for a month or more, and I heard through others (not a word to me, you may know) that he said he made a terrible blunder buying them so early; that they acted like spoiled babies; nothing was good enough for them, and they actually lost flesh till grass came, although they were gaining about a thousand pounds a month, thirteen of them, when he took them away. Now, this is not told with any desire to brag at all, but rather to give a hint to my young readers in particular of the very foundation of success with stock. Alas, how few are treated in this way! Do you say one cannot afford to take so much pains? He cannot afford to take less, and I would not want to if I could. We should feel in duty bound to make our animals as comfortable as our means will permit. I do not know when I have enjoyed anything more than a remark of my neighbor, Edward McCauley, when he was looking at my horses in their box-stalls in my new barn one cold, stormy day: "Why, Terry, your horses are as comfortable in here as you are in your new home." Thank God, yes! and do they not deserve it at my hands? Faithful, tireless servants, helping us to get our comfortable home and never having once served us a single mean trick. But aside from this righteous view of the matter, one cannot afford to have any stock kept for money-making any other way than comfortable and contented. Breed is a good deal, but so is feed and care. Would it startle you if I said that few cows in Ohio know what it is to have enough to eat? But it is true. Think. The great mass are turned out to pasture. Feed may be flush for a month or so and they half starve during other dry, hot months; at any rate, they do not get half as much to eat as they did in the best of the season, and of course they must cut down on their milk. How many cows can you think of that are fed all they can use of suitable food, every day in the year, and given pure, fresh water and entirely comfortable quarters, and whose wants are attended to with clockwork regularity? I would look for profit in the stock business in this direction. Half-way work no longer pays. There is too much competition in the half-way line. You would not be a slave to your animals? Well, then, you will never attain any very great success any more. I went home with a successful manufacturer from an institute once, and he told me how he was in debt for the boots he had on his feet when he came into the town. Now he employs, perhaps, one hundred and fifty hands, and can count his money by the many thousands; but I found when right around with him that he was almost a slave to his work, his business. He was up early and out late, trusting much to others, of course, but watching and seeing that it was done. I concluded that he was about as tied up every working day in the year as I was when I took the best possible care of those steers. Rest assured, friends, that when success of the highest kind comes, somebody is working hard and systematically and untiringly. To make money from cows is very confining work. And the worst feature with me is that about as much must be done Sunday as any other day. It is necessary, however. If I could not make my cows comfortable Sunday as other days and go to church, too, I should know where my duty was. A man can serve God in his own barn. Care of animals of all kinds in winter is confining. I would not disguise the fact. My present tillage farming gives more leisure and full rest on the Sabbath. But if I kept animals, then I would keep them and be confined enough to make it successful. I did do this.

In many sections farming cannot be successfully followed without stock of some kind. It can be here, and often with less hard work. Still one can farm right here with animals and make money. I know I can do it on my farm. But not in old ways. With the good care spoken of above, and choice thoroughbred or grade stock, and with the manure all saved and used to the best advantage, and with a silo and ensilage corn, and purchased bran, and oil meal, and cottonseed meal, and dried grass instead of hay, and all other advanced ways put into practice, I know I could make money in more than one line.

Perhaps one reason my horses have done so well on clover hay only, as told of in another chapter, is because they have been pretty well taken care of. My father used to tell me when I was a boy, that a good cleaning was as good for a horse as four quarts of oats. I did not believe it then as fully as now. There is no question but a well-curried horse does better. Also, there is a good deal in proper feeding. Some horses at least would eat themselves poor, if hay was kept constantly before them. I want them to have a reasonable feed that they will eat right up, as a rule, and then go without till another feeding time comes around.

The only exception to this is when the horses are very hard at work; then we let them have about all the hay they will eat during the night. But they do not eat all the time then, but rather eat for a time and then lie down, and towards morning get up and eat some more. In the morning and at noon they are only moderately fed, and always so fed when idle or doing only light work. A horse can eat grass in the field constantly, or all it wants during the day and night, and do well. But grass is a natural and easily digested food. Hay is not as easily digested, not even dried grass. The horse does not know this. The owner should exercise judgment for him. We often hear clover hay objected to as more likely to produce heaves. I was asking Dr. Turner, State Veterinarian of Missouri, in regard to this last winter, and he said heaves were caused by a rupture of some of the air cells of the lungs. This rupturing was done by coughing and the coughing was caused by dust. That clover hay was more liable to be dusty than timothy, that was all. There was nothing about good clover hay to produce heaves. I asked him if a horse over-ate, was allowed to fill himself very full of clover, and then was pulled hard, whether heaves might not be caused. He thought not. Said the horse might be uncomfortable from being so full, but heaves could not result. Clover hay is certainly more liable to be dusty than timothy. It is quite difficult to have it always bright and perfect. When I used to do my own feeding, I fed the hay dry, unless I found some that was dusty. But of late when others feed for me, I have a rule that all the hay shall be sprinkled when fed. We have water right by the stable door, you will remember, so it is not much trouble with a garden sprinkler to wet the hay a little in the mangers, as it is fed to the horses. With care, I do not think clover need produce heaves. Still there is a difference in horses. I have one horse that all the dust in the mow would never affect, and another that it will not do to be careless with. We water horses three times a day, and in hot weather, when they are at work, they get some in the middle of forenoon and afternoon. With this moistened hay I do not think it makes any difference whether they are watered before feeding or after. I have usually done the latter way. Where much grain was fed, perhaps the former would be better. But I believe the main thing is for them to have enough and often, and not have to go so long and get so thirsty that they drink large quantities at once.

I would feed cattle the same as horses, no more at once than they would eat up clean and quickly and with a relish. As to watering, cows and steers seem to be different from horses. Some will drink well twice a day and I have had many that would not, but would drain a pretty large tub when they did drink. I usually have offered them water twice a day when feeding high for beef or milk, but all would not drink twice. Perhaps this is partly a matter of habit, as most stock in this section is watered but once a day. I would like to repeat here what in substance has been said before, that in any line of stock keeping in the older States now the profit must largely come from the manure. Not that you get more from the animal than you feed her, nor as much quite, but you can manage so as to save a large part and return it as plant food. And by purchasing mill feed you can get extra fertility for your farm. No matter whether you do this or not, if you waste half of your manure by having leaky stable floors and other careless treatment, much of your profit will be gone. Competition is so close that the business can hardlv stand this drain in Ohio now.

You have often heard it said that if a cow is allowed to run down in her milk, particularly late in the season, she can never be brought up again till she becomes fresh. Well, do not let them run down; that is right. But they can be brought up again. Good care and dried grass and water only will do it; this I know. I have done it time and again. When we wintered cows for others they were often brought here almost dry. The owners told us to milk along until they became dry. With our warm stables and care and feed they would come right up in their milk and we have made many a hundred pounds of butter from "dry cows." If they were really good cows it was difficult to dry them off on such feed. It seems to me that not a few could learn a lesson from this.

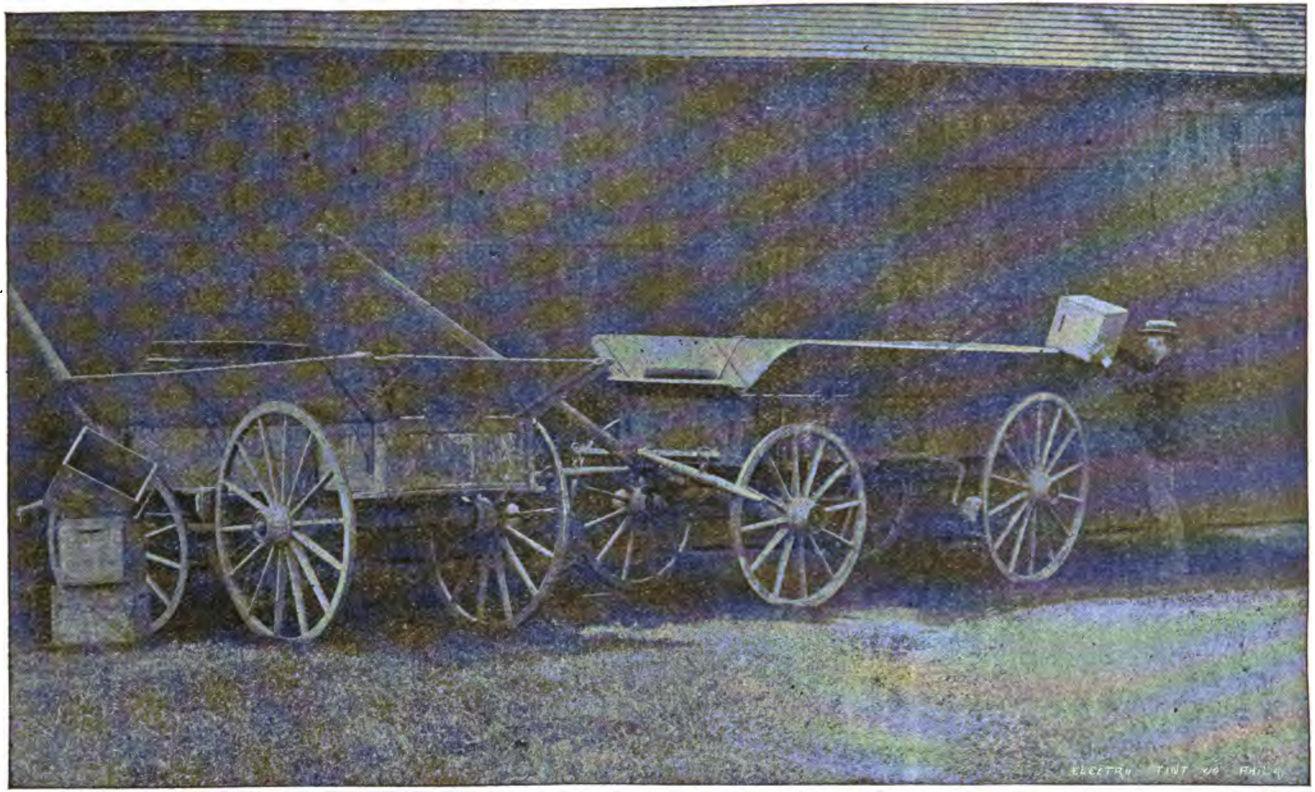
Another point: My little success in feeding was in an old barn and sheds destitute of paint and very roughly built, but made warm and comfortable by my own efforts cheaply, as I have told you about. There is no feature beyond the reach of any one. Don't forget and think: "Oh, yes, he could take care of animals in his warm, nice barn and covered yard." You would like it better, of course, but you can do without such improvements until you can earn them, just as I did. It would be a delight to me now to care for some fine animals in my barn, the chance is so good; but perhaps no more than it was years ago to conquer under no end of difficulties.

# CHAPTER XXXI.

## BIG LOADS.

THE writer had some little experience as a teamster before he began farming. He drew some sand, gravel, tiles, etc., for others, by the yard or piece, so that the size of the load drawn measured the profit. When he came onto the farm it was with a light wagon, so that he could do nothing in the line of drawing heavy loads. In truth, he did not have heavy loads of anything to draw at first; but when he got a better wagon and had something to draw, he tried to help himself some in this direction. And he has, not a little. About the first teaming we had to do to amount to much was drawing wood to town, two and one-half miles. A pile of eighteen-inch wood 8 x 4 feet, is called a cord of stove wood here. This was all my little wagon would hold by piling. With common sideboards on my new wagon, I could pile on one and one-half cords. But to do this alone took a good deal of time. I could make but three trips a day, or four and one-half cords. There are farmers in this county who draw no more now. But this was not business enough for me. The price of stove wood was, say, $1.75. It cost about seventy-five cents to get it cut, if hard, and pay interest on the money while it was seasoning. Say the timber was worth fifty cents standing. This left fifty cents for the drawing. Four and one-half cords a day would be $2.25. Pretty small wages. But it is no use to say wood is too low; you cannot make it higher. But you can reduce the cost of production in the way of handling cheaper. A little study, after I had some experience, showed me a way out, and I went to the wagonmaker and told him just what I wanted in the way of sideboards, and stood right over him while they were being made and ironed. We got them just right the first time and they have never been changed at all, and they are still in use on my farm, after more than twenty years, this very original pair, and you shall have a picture of the wagon. Now, what was the result? Why, I went into the woods and threw on without piling two cords of stove wood at once. A little care was taken to toss it in rather straight under and around the seat and place it a little around the outside, and it had to be thrown up pretty high, but I got on two cords and did it quickly. I saved time enough in this way, by not piling, so I made four trips a day. It was a big day's work (and one couldn't stop to talk any), but I did it, day after day, and week after week. Now, how much would I get for team work on the basis figured above? Eight cords at fifty cents a cord gave $4. That would do. But had I worked on in the old way, whining about wood being so low, I might have kept on till I was gray without making anything. In three or four days I had paid for the sideboards from the extra money made. After a time I got more horses and another and longer wagon on which I could with care throw two and one-half cords of stove wood. These two wagons have been in constant use on the farm even since, often with these sideboards on. They enable one to put on a large load without having it very high up of such articles as potatoes, bags of grain, bran in particular, corn in the ear, stove wood, sawdust, etc. Look at the picture, engraved from a photograph, of these very wagons that we have used so long. You see, a man can easily empty in a bushel of potatoes, and on the smaller wagon we have often drawn two tons of potatoes to the depot at a load —sixty-seven bushels. Unless there are springs under the wagon, however, the road must be very smooth to carry so many. They can be piled on, the top of wagon is so wide, and will go all right on a smooth road for a little ways. The first time I went on a long trip with such a load, though, I found they would roll off after a little. Bolster springs prevent it. Some of my success in market came from my using springs and piling my load up very high in the middle. They showed off to good advantage. A small load, shook down in a lumber wagon by a long trip, although as good potatoes, *look* 20 per cent. poorer, and looks help one about selling. When a grocer sees people crowding around a fine load of potatoes, it is quite an advertisement for him to come right out and buy them while the crowd is around. This is a string I have pulled quite a little. And I used to have my wagon nicely varnished as well as painted, and washed clean, and a good canvas cover. Then when I got near the city, I would take this off and fix up my load and drive in slowly with the potatoes piled up high in the middle, so every one could see them, and the very large load helped draw attention, too. So I was getting potatoes to market faster and getting more for them, too.

I have tried several kinds of bolster springs. They are not very satisfactory, although they answered my purpose pretty well. If drawing to market now I would get a good platform spring wagon. Now, let me describe the pictures. The photograph of wagons shows them with sideboards on. These sideboards are portable; that is, can be taken off or put on in a minute. They just slip right on and lift right off. I wanted them so because we want to change often and cannot afford to waste any time. To have fastened them on the box would have been a simple matter; but to arrange them so they could be put on or off in one minute, and still be strong enough to carry two tons, and light enough for one man to handle, required some study. Fig. 1 shows a side view of one sideboard taken off. The right



ELECTRO TINT ENG. PHILA.

Our Wagons with Sideboards On.

end is the rear, of course, and you see the little iron into which the hook of the tailboard (Fig. 3) goes. Fig. 2 shows you one of the three sets of irons that are on the sideboard. The inside iron is one-half inch by one inch, the outside one one-quarter inch by one inch, and the brace one-half inch round iron rod. These irons are bolted in two places to the sideboard by bolts passing right through each near the edges of the sideboard. Sideboard is eighteen inches wide and same thickness as side of wagon box, seven-eighths of an inch. These irons simply slip down on side of wagon box, one on each side. The heavy iron inside and brace outside holds the load. If to be used constantly it would be well to put some band iron plates on out and inside of sides of box where these irons slip over, to prevent wear. On my longest wagon, I have four sets of irons on sideboard instead of three, as you will notice in picture. You will see, the whole thing is very simple, but built as directed and with the tailboard in and hooked, it will carry an enormous load of anything bulky. I have never broken or even bent a brace.

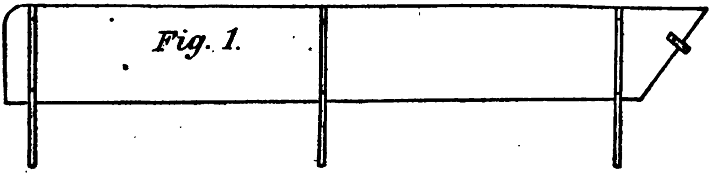


*Fig. 1.*

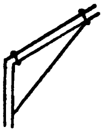


*Fig. 2.*

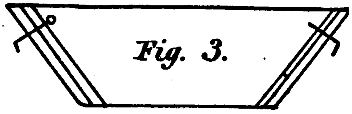


*Fig. 3.*

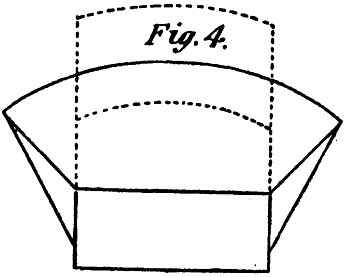


*Fig. 4.*

Fig. 4 will give you a chance to see with the eye the advantage of this style of top box. It is a cross-section, of course, of wagon box. The plain lines show the box and top of a well-rounded load. The lower dotted lines show how much less load one can get on wagon with common top box of the same heighth, while the upper dotted lines show how very high the common top box would have to be in order to hold as much. It would not be practical to load into. Now, my kind of sideboards cost little or nothing more (not as much as common ones high enough to hold same amount) and can be put on or off as quickly. From this figure and this statement you must see the gain.

When our roads here are good, two ordinary horses can just as well draw such loads as I have spoken of as less, the short distance we have to go to the depot. But do not understand me as advising the overloading of horses. I never do this. It is entirely wrong, as well as bad business policy. But our farmers about here are not in danger of doing this. As a rule, when they go to market they are not rigged to take as much as their horses could readily draw. Some ten years ago I got to the mill in Akron, twelve miles from here, rather late in the day, and on a day when there was a great run. The result was a long wait for me. I amused myself by keeping account of the number of bushels of wheat each farmer had on. The average of fifty-four loads was twenty-four bushels. Some of these men had come as far as eighteen miles. Nearly all had good, strong teams that could as well draw 3,000 pounds as less than 1,500. My two wagons had on ninety-four bushels that day. Can you not see that I was accomplishing nearly twice as much in a day as the average of them? Even if one does not do very much teaming he should arrange to make it pay. The regular teamsters here who draw gravel and sand never think of drawing less than 4,000 pounds when roads are good and not too hilly.

The wheat from these fifty-two loads was loaded into a car, which was run into the mill each time, to be weighed and emptied. It held only forty-four bushels. The miller told me it was rarely filled by one load. Of course, they would have had it larger, if farmers all drew such loads as I. They had to put some bags on top from my loads.

But now, when the roads are bad, or one has a long distance to go, these big wagons may want a little more power in front than two horses of ordinary size. Then, what you want is my three-horse pole for driving three horses abreast. I was rather forced to study this up also, in order to make my work pay. An ordinary two-horse team will draw with ease, under fair conditions, 3,000 pounds of load. The wagon, sideboards and driver will weigh, say 1,000 pounds. The total load for the two horses is, then, 4,000 pounds, or 2,000 each. If now, you can hitch another horse with the other two, so he can draw as directly on the load as they do, he can draw 2,000 pounds more load, as there is no more wagon to draw. This makes the total load, exclusive of dead weight, 5,000 pounds. Three thousand pounds with two horses, and 5,000 with three; which pays best? And this is just what I have done. And further, this three-horse team can be handled anywhere that a farmer needs to go, and just as readily. Why not use it when the circumstances are favorable, and make the third horse bring you 33 per cent. more than either of the others. But I said I was forced to study this up. This is how it came about: Before my farming became profitable, I took a large job of drawing gravel from near my farm to town. It was for use on the roads. The price paid was fifty cents a ton. By putting on 3,000 pounds, which was a fair load, one could earn $3 a day, by making four trips. Most of the teamsters put on 4,000 pounds and made $4 a day, but it was a wet time, and the roads bad from so much heavy hauling, and they overworked their horses. I had signed a contract and would lose if I failed to fulfil it; but I did not want to work for $3 a day. For some days I held off, while the road was full of teams and everyone was growling because they could not make anything. At last, I had it studied out and went to the wagonmaker once more with drawings, and stood over him while he made the double pole shown in Fig. 5. By taking out a single rod, the two-horse pole is removed and this put in, taking but a moment. By putting one horse in between the poles and one on each side and using a pair of three-horse eveners, you have a direct draft. With this rig I drew 5,000 pounds of gravel every single load, instead of 3,000, and with the same ease to horses and made $5 a day. Had I driven only two horses, the third would have been idle. As it was, he made me $2 a day. I have drawn my entire crop of potatoes twelve miles to Akron, some years, alone, with this three-horse arrangement, and one fall I got caught with four car loads on hand when constant rain made roads almost impassable. But, by taking my lightest wagon and three horses, I never needed to draw less than fifty bushels to a load. It would have been an expensive job for me to have gone with two two-horse teams and a man to drive. Don't you see, I did about as much alone. I drew 3,000 pounds of load, or 4,000, wagon and all. This was 1,333 per horse. A two-horse team would have been able to draw 2,666 pounds. Taking out the wagon, this would be 1,666 pounds of load, or 166 pounds more than half of what I drew. Of course, we do not mean to be caught this way, but when we do, the three-horse pole comes handy. I have driven this rig into the smallest yards in town, and through the most crowded streets in Cleveland, without trouble. The poles are about the size of a large carriage pole. Being two, they do not need to be as heavy as a single wagon pole, as the strain is divided between them.

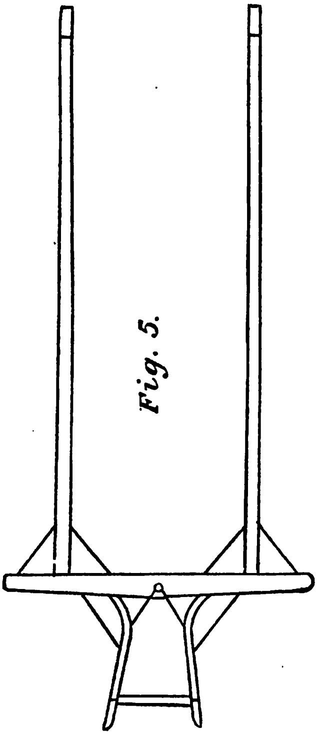


*Fig. 5.*

They are mortised into the crosspiece and braced thoroughly, you will notice. The crosspiece should be longer than just to come to end of poles, so as to give room for a brace outside. My poles are three feet apart, from centre to centre. The three-horse doubletree goes on top of this crosspiece. Any kind of a one can be used, but I have a simple one shown in Fig. 6. It is six feet long, with three whiffletrees, each two feet four inches long. This has one advantage ; one can use short whiffletrees and get through a pretty narrow gate, and it is very simple and light. At first thought it will appear to you that the middle horse has a dead pull, but this is not the case, as you will notice. I have had men come to my wagon when I was in the city, and be so certain of this that they offered to bet their farms on it. But it is never best to bet on the other man's game. This figure will make the matter plain to you. We cross the inside traces, making each whiffletree an evener. There should be a ring between the clevis on evener and the one on whiffletree, so as to give plenty of play. You see, the middle horse is not hitched to the middle whiffletree at all, but to the inside ends of outside ones.

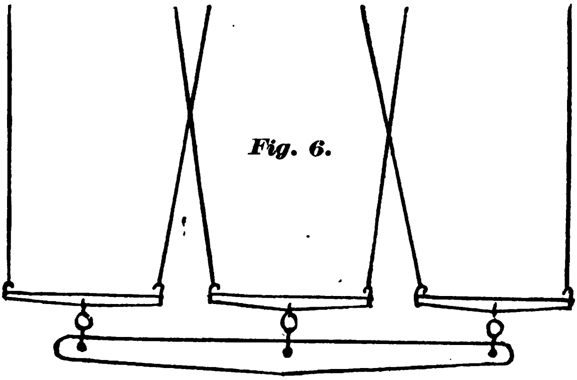


*Fig. 6.*

One can have a set of three horse-reins made, but I have not found it necessary. I use my two horse reins with the addition of two hitching straps for extra checks. So fixed, I have handled horses in crowded streets. Take the two-horse reins and put the whole reins through on the middle horse, one on each side. Then put on your extra checks, so you have two checks on each rein. Take the right ones and pass one over middle horse and hitch to right side of bit of left horse, and pass the other over the neck of right horse and hitch to right side of his bit. This rein then pulls all three horses to the right. Fix the other all to the left. A little shortening or lengthening of the checks will enable you to handle them all right. I always put the best horse to back in the centre. Going down hill, of course the brakes hold the wagon, but sometimes I want to back up to a place to unload, and as I arrange it the middle horse has to back against the other two. I use two 3-foot neck yokes, giving the middle horse an end of each. Have always been able to back my load in any reasonable place. One often sees four horses hitched to a big load, two ahead of the others. I have tried this side by side with my plan, and three horses abreast with this direct draft will draw as much as the four with one team ahead, and, of course, they handle better.

# CHAPTER XXXII.

## MUCK.

THERE are many acres of muck swamp in this vicinity. At the north end our farm runs down into a swamp of some 200 acres. This is rotten vegetable matter as far down as I have ever dug. It is surface-drained by open ditches. I went to considerable expense to drain my few acres some two feet deep, so as to have a place to get muck for composting and using as a fertilizer. From what I had read I thought it would be valuable to use on my upland. I suppose we got out the muck in about the best way, and I will briefly describe our plan of operations. Beginning at the back end, so as to make the hole where it would be out of the way, we threw up in the fall a strip of muck eight feet wide and three feet deep, throwing it, of course, to the south (see plan of farm). It made a large pile. The last foot was taken from under water, or below water level, but by leaving a little muck around the outside, taking a rod or so at a time, we managed to throw most of it out. The little strip left served as a dam to hold water back. We would find logs of considerable size down in this muck, where they had been for ages, under water nearly always. They would seem sound to look at, but generally would slice right up with the spade. This bank of muck was left to freeze and drain during the winter, and then for the action of the sun during the summer, and then it was ready to draw away and use, after which we threw up another lot.

We drew some directly onto our land, and spread it, but, usually, composted it first. When composting, we drew the muck in the fall up near the barn, and spread a layer, say, four inches thick on the ground, making it about twelve feet wide, and as long a pile as we wished. Then, driving on each side, spreading half each way, we put on a thin coating of ashes. Perhaps slacked lime would have been better. But, for potato growing, we thought the potash in the ashes would be valuable. There is very little in the muck. The ashes were collected at saw mills in the vicinity. Next, another layer of muck was spread on from each side, and then more ashes, and so on until the pile was four feet, or more, high. It was then out where we could get it to compost with manure in the spring. We could not get into the swamp to draw it out in the spring often. This pile of muck and ashes was then composted with the manure, load for load, except that the bottom and top were both muck, and we used a larger wagon to draw muck on. Thus treated, the manure was rotted without any waste, during the summer, so we could handle it with scoop shovels in the fall. If one must compost, the muck, undoubtedly, did good in the way of saving manure, both from leaching and from the escape of ammonia. Where muck can be used in a yard or stable, so it saves liquid manure that would otherwise go to waste, it is certainly valuable. Theoretically, it was very valuable as we used it. Although we more than doubled the amount of manure by adding the muck, science said it was still worth about the same, load for load, as the original manure. I say science; perhaps I should say the chemist. I shaved down from top to bottom of one of these compost piles, so as to get a fair sample of the whole, doing this in the middle of the pile, when we were drawing out, and had it cut down perpendicularly. This was thoroughly mixed, and a sample sent to Prof. Lord, the State chemist. He made it worth, on a basis of commercial manure prices, $4.44 per ton. This almost set me wild. If I could make manure in this way of that value, I could get rich. I went into muck hauling at a big rate. But my bump of caution is large, and, after I cooled down a little, I thought it would be well to know more about what I was doing practically. Now, do not understand that I did not have full faith in Prof. Lord's analysis. He was right, from the chemist's standpoint, beyond a doubt, but I did have a doubt whether I could, or did, get out of that muck what he found in it.

Well, I began to experiment some with muck and with use of ashes and also with fresh manure. Now, no farmer who is making his money by his work can carry on such experiments so as to certainly tell exactly what is best. But I went far enough to convince myself that, first, ashes did no sort of good on my land (*i. e.*, there is potash enough in it for the present). Second, that I got about the same immediate results from fresh manure as from the increased quantity of compost and with far less expense. Third, that muck, although it contained a good deal of nitrogen, was very loth to part with it, and there was and is a serious question in my mind, whether it does not absorb nitrogen or ammonia from the manure in compost and hold onto that, too. Instead of getting $3.00 or more from a ton of muck—what is really in it—I doubt whether I got thirty cents during the first two years. Perhaps it may, little by little, give up its substance to the crops, but it is too slow. Prof. Lord has offered to try and find some way to set free the nitrogen in a sample, if I will send it to him. But I hardly believe it can be done practically.

Plenty of people who lived around these swamps told me there was no money in drawing out the muck, but I was smarter than they, in my own estimation, and paid no attention. They also told me, some of them, that tile draining would not pay and buying clover seed when timothy was cheaper. But this time they were right. One man who was born and brought up on the old farm, Mr. Ranson Sanford, said that many years before they dug a ditch and drew the muck up and put on a spot for a garden and never could see any particular gain from its use, although they piled on a lot of it. My old neighbor and friend, S. Holcomb, would come along when I was at work at it and say: "Drawing out more swamp dirt, are you? Well, I have had my day at it and found it did not pay, and so will you." About the time of the above analysis a number went to drawing muck out, something as I did; but every single man has quit after a little trial. I can get that muck out for, say, thirty cents a load, but have not drawn a load except to use in earth closets for some eight or ten years.

Now, I would not say it does not pay in some cases, but rather advise a little caution, so that you know what you are about before doing much work. Every year some one without practical knowledge tells in the papers a great story about the value of muck. Possibly some muck may be more valuable than mine; but I know of none that has analyzed higher. I have one clay spot on the farm that I think some time I will try a heavy dose of muck on, to see if I cannot lighten up the soil some. There is one thing against the use of muck, it is full of weed seeds and makes a greatly increased crop of these to fight. If you try drawing out any, be sure and pile it up a year on bank of ditch and let it dry out. You will then have only about half the weight to draw. If I remember correctly, my muck taken out of water would dry out in the oven 85 per cent. You can air dry it about 50 per cent. which saves much in handling. I had an idea for years of trying to kiln dry it in some way, so it would make a better absorbent for stables, but never tried it.

See how much I wasted for the time at least in buying ashes. This from reading in the papers of their great value, particularly for potatoes. How simple a matter to have put some on part of a field and found out about it before spending money that was sorely needed in other directions! When I got my bearings and did this, I could not see one particle of gain from their use. I have tried several times since and they never show where they are put. But they are of great value on some soils. The point I would have you fix in your minds from this chapter, friends, is to not go into anything blindly or thoughtlessly. Think and study and experiment lightly until you know you are right and then pull the throttle wide open and let her go. Don't get excited and let out first and think later.

But, perhaps, I can tell you one thing about muck that will help some one as much as it has me, and that is how to get out a horse or cow that has mired in a muck bottom ditch. We have ditches of this kind that no animal can cross in wet weather, and any new one is apt to try. There is just one safe, easy way and one can do the job alone, if need be. A large rope might be better, but I use chains because we always have them handy. First, I take a chain of proper length and pass it around the animal, not around the body perpendicularly, but horizontally, passing it well down under the hams, behind and around the breast in front, right down in the water or mud and hook it moderately tight. Place some old carpet or sacks between chain and breast. Then, reaching over animal's back, pull up the two sides of the chain until they come together, or nearly so, on back, and hook around them another chain to pull out by. Now if you can back a team right up to the bank of ditch, you may hitch directly onto this chain, and, perhaps, slope off bank a little with a shovel, and with a very steady pull take the animal right out. I have done it in less time than it took to write this. But there is a rather better way. Back a wagon right to the brink of ditch, so the hind axle is over the cow or horse, nearly, and hitch chain to axle. Then put team to wagon and pull steadily. This is better because it pulls up more. If ground near by is soft, so you cannot get a team in (animal is mired in a swamp), run wagon in if possible by hand, on boards or some way, and hitch chains or ropes or poles together from the pole of wagon to where a team can pull. This is a safe plan for the most valuable stock. The first horse we had get in a ditch kept us and the neighbors busy most of the night getting him out, horses and men, just because no one knew just what to do. I have taken a horse out of the same ditch, alone, in fifteen minutes. When I was drawing logs one winter, word was sent me that a very large cow was in the ditch. It was very cold and just at dark, and I had a sled and chains all on it. I passed the house with horses on a run, when I got home, whipped the chains around her and had her out before any one got down there, and she came very near running away with my team before I could get the chain unhooked from doubletree. Of course, you want to get team close back, with short chain to pull by, if you can, and then stand by to unhook the instant they are out safely, as an animal is apt to be considerably surprised and excited unless they have been in so long as to be stiff. In this case they should be taken to barn on boat sled, or covered right there and rubbed and tended to. I once had a valuable cow get through an airhole in the ice in very cold weather. No business out there? You are right, but it was before we were able to do better. When I heard of it she was very nearly gone—chilled to death. Without any delay I took her out with team as above described, tossing two or three flat fence rails on the sled as I went down. These I stuck in slanting to slide her up on, so she would not pull against the edge of the ice. There was no time for fussing; she must come out in just one minute, and she did, and I slid her right up onto the low sled with team and pieces of rails in another minute and took her to the barn flying, my man and I holding her. She was too far gone to struggle any. There we warmed her and worked over her, and finally saved her, and I sold her with her calf for $100. If there had been any delay, if I had not known just what to do, she would certainly have died.

# CHAPTER XXXIII.

## KNOWING WHAT YOU ARE ABOUT.

A LEADING merchant in an Ohio town failed. People who had trusted him and had funds in his hands lost to the amount of $30,000 or more. He had been in business some twenty years, and had the confidence of the entire community. He sold all kinds of goods and did a private banking business. Everyone wondered at his failure. The creditors thought there must be something wrong, and called for an investigation before the probate judge. This ruined business man, as shown by his own statements made under oath, had never kept any regular cash account or any other accounts, by which he could know just what he was doing at all times. He had plenty of accounts with individuals—too many—but no account of bills payable or receivable. After this testimony was made public, his failure was no longer a wonder. He was a shrewd business man in many respects, but here was a weakness on a vital point, as you will all see at a glance. Any thinking man must say that if he had been particular in his accounts, and known just what he was doing, when he began to run behind he would have looked closely for the reason and probably so arranged as to keep on without loss. As it was, he did not know whether he was losing or making, or when he began to lose, or anything whatever about it. He had large quantities of other people's money in his possession; he did not know how much, and before he knew it, he was badly under. He was an old and particular friend of mine, and I have not the least doubt he intended to be an honest man, but his carelessness amounted to dishonesty, as far as his creditors were concerned, and my friend dropped in an hour from a very high position (he had an "Honorable" attached to his name) to a very undesirable one.

Now for another pen picture: Mr. Ohmer, the well-known Ohio horticulturist, tells of meeting a young friend of his who had gone into business for himself. "Well, Tom," Mr. Ohmer says, "are you making anything?" This sounds exactly like our good friend Ohmer. He is very blunt and pointed, as well as kind and genial. At first "Tom" looked as though he thought it was none of Mr. Ohmer's business, and then melting under his friendly look, which no man could doubt, he candidly answered, "I do not know." "Well, you ought to know," said Mr. Ohmer, and passed on. This was a dozen years, or more ago and Mr. Ohmer had almost forgotten him, when he happened to come across him again. Tom grasped his hand most heartily and says: "Nick Ohmer, that little remark you made to me when we met last, that I ought to know what I was doing, has been worth thousands of dollars to me. It set me to thinking, and from that day to this I have known and have been very successful, and I believe largely because I followed your advice."

These are both true stories, and they show the usual results of knowing and not knowing what one is doing in mercantile pursuits. Is there any lesson for us farmers in this? Yes. Farming is not an exceptional branch of business which one can follow most successfully in the dark, or without knowing what he is doing. The farmer needs to use his pencil as well as the merchant. He should know whether his farming pays or not from the figures, and whether each crop pays on the average. One may pay well and another lose him money. How is he to know about this so he can act accordingly, except from accounts kept? He cannot. He may give a fair guess, but we have had too much of this guess-work farming. One winter at quite a number of institutes the writer asked all farmers who could tell, if at home, from accounts kept, what their gross and net income was, to hold up their hands. How many do you think went up? In one case three, never any more, and sometimes only one. In one meeting, the largest in the State, where there were, probably, 1,000 persons in the hall, only one hand went up. I afterwards found that this man had fifty acres of land, largely in fruit, and after taking out his total expenses that year for help, taxes and everything ($1,500) and deducting six per cent. on his investment, he had fully $2,000 left to pay for his time. A salary of $2,000 a year on a fifty-acre farm! I have no doubt his figuring had helped him. I know it had from what he told me, and I could repeat but for lack of space.

At the institute in my own county I found a dairy farmer who knew just what he had done, and could give the figures to a cent. For example, he sold milk from sixteen cows to the amount of 106,717 pounds, or 6,669 pounds per cow on the average. This was $73.61 per cow. He paid $285.44 for mill feed, keeps no regular help, milks all cows himself, knows just what he is about, has a little farm and his name is A. D. Mills. By the way, he has done better since. He got $107.26 more money the next year. You may not know the above figures are more than double the average. How much did figuring have to do with it?

Some crops and some practices pay a farmer, and some do not; pray tell me how he is to work into the ways that pay best, unless he knows from accounts kept just what he is doing? It is simply impossible. It is impossible to do real business farming. I went home with my friend, Geo. E. Scott, of Mt. Pleasant, O., from an institute once, and found he had a pair of wagon scales, and was not only figuring, but weighing, to know what he was doing. The successful farmer of the future must make use of these simple business practices. Oftentimes a careful figuring would give us farmers a greater respect for our business. We are often doing much better than we know, when everything is taken into account. Figures will show that on many farms the owner is making as much money, in proportion to capital invested, as the ordinary business man of the city does. I remember visiting one farmer who was complaining of only making 3 per cent. on his investment in the farm and stock, etc., who was living in a new house costing $3,700, which he had given the farm no credit for. This would have cost him $1 a day, Sundays and all, in a city, and would add a good deal to the 3 per cent., and, doubtless, many other things were not credited to the farm that would cost money to any business man in town. Farmers are, I think, generally doing better than they think for, and it would do them good to know all about this from figures kept. If they are *not* doing well, then they certainly ought to know, so as to try and do better. I met a farmer the other day and asked him how much he made net the last year. He is one of our best farmers, too; a reading, progressive man. He replied to me: "I don't know, and don't want to know; as long as I have money to spend when I want it that is all I care." Well, this may do for a well-to-do old farmer, but for the man trying to get ahead and pay for his place, will not such carelessness lead to the same result that it did with the merchant first spoken of? If not, then farming must be a wonderful business.

A farmer who blunders along good-naturedly in the dark may be a very good man, a good neighbor, a good citizen; but would he not be a more useful citizen and a better man if he would use all the powers God has given him? Would he not exalt his calling more and could he not surround himself and family with more of this world's comforts and luxuries? I fully believe so. We want a little more lead pencil and less muscle nowadays. Often have I heard farmers say: "Those who work the least seem to make the most." Alas, too many think, muscular labor is the only real work. Some of it is necessary on the farm, but much of the other kind must go with it to make the most.

In the matter of bookkeeping for the farmer, I would not advise any complicated system. We have no time for red tape. A simple cash account ought always to be kept by every farmer, or any other man handling money. This should show every dollar taken in, who it was from and what for, and every dollar paid out, who to and for what. This can be done very briefly and easily, and will help greatly towards good business habits. You then know just what you are doing. It is convenient to refer to, and may save one money sometimes. I do not keep any day-book or journal, but buy a book ruled as a ledger at the book store. Let me give a few items, as an example, right from my cash account:

| 1892. | | Cash Paid Out. | | | 1892. | | Cash Taken In. | | |
|---|---|---|---|---|---|---|---|---|---|
| June | 17 | 5 bbls. Land Plaster (R. T. Lyon) . . . . | $ 5 | 38 | June | 16 | Cash on hand . . . . . | $ 12 | 25 |
| | | Lawn Shears . . . . . | | 50 | | | Check sold C. A. C. . . | 20 | 00 |
| | | Freight on Plaster . . . | | 63 | | | D. W. M. (loan returned) | 14 | 00 |
| | | Express on Goods . . . | | 45 | | | 2 balls Twine (M.) . . . | 1 | 12 |
| | | Meat . . . . . . . . | | 67 | | | 64 bus. Seed Potatoes (M.) | 64 | 00 |
| | | 6 pounds Butter . . . . | 1 | 20 | | | | $111 | 37 |
| | | Eggs . . . . . . . . | | 63 | | | | | |
| | | Robert . . . . . . . | 2 | 50 | | | | | |
| | | Washing Machine (W. W. W.) . . . . . | 7 | 00 | | | | | |
| | | Church (Mrs. R.) . . . | 5 | 00 | | | | | |
| | | Binding Twine (Campbell) | 3 | 20 | | | | | |
| | | Ice Cream . . . . . . | | 30 | | | | | |
| | | Geo. Pendleton, work . | 7 | 40 | | | | | |
| | | Grace, trip to Painesville | 10 | 00 | | | | | |
| | | Lumber (Shields) . . . | 2 | 60 | | | | | |
| | | Wife, Silver Lake . . . | 2 | 35 | | | | | |
| | | Adam, work . . . . . | 1 | 75 | | | | | |
| | | Repairing Watch . . . | | 75 | | | | | |
| | | Union National Bank . | 50 | 00 | | | | | |
| | | | $102 | 31 | | | | | |

From this you will see plainly how we keep our cash account. Start by putting the money on hand down at the head of the "Cash-taken-in" column. Then, if everything that is taken in, or paid out, is put down on the proper side, the difference between the footing of the two sides at any time will show the cash in your pocket to a cent. For example, the account, as it now stands, foots up $111.37 taken in, and $102.31 paid out. If all is right, then, there should be the difference between these amounts, or $9.06, in my pocket. If there is not, if it is more or less, some money has been taken in or paid out and not put down, and we hunt it up. This is what business men call balancing the cash, and ours has to balance, and then we know everything is right.

I might explain these entries more particularly. I have not bothered to put in all dates here, but every entry is dated on the book. The first entry not only shows that the land plaster was paid for, but, when I want more, I can quickly turn to this entry, and get dealer's name in the city to whom I sent for it. I do not trouble to put down who small purchases (butter, eggs, meat, etc.) are made from. The washing machine was bought of W. W. Winchell, and the initials would call the name to mind. The $5 for church was paid to Mrs. R., the treasurer's wife. The binding twine came from a dealer here, C. A. Campbell, and so on. The $50 was handed in to the bank, when I was there, on deposit. On the other side I got $20 in currency by selling my check on bank to C. A. Campbell. Two balls twine left were sold a neighbor for $1.12, and so on.

We buy and sell for cash, but occasionally must wait on some friend. Anything of this kind we put on a memorandum account until paid. Large bills are paid by check on the Union National Bank of Cleveland, and some checks received are sent directly to them. These are not entered on the cash account, but on the bank account, with the name of sender and what they were for. So, from the cash account and bank account together, we can always tell just where every dollar has come from or gone to. The bank account is kept the same as the above cash account. All we send them is put on one side, and all we check out on the other. Once a month they return all canceled checks, and send statement of account. Several times a year, always the first of January and April, I write out in a little book a simple statement of cash and credits, which shows just what we are worth outside of the farm property, which is visible. So I always know just how we stand, and if these simple business habits had not been followed up for all these years, I know we would not be as well off. For several years it was determined by wife and I that our assets should figure up just an even $1,000 more every January 1st. And we did it. Then, in the spring, we would get something new, that we most wanted, to use up the excess, if any. Then we would hold the reins pretty carefully during the summer until we were sure we could lay up the $1,000. You men who do not keep account, did you never wonder what in the world had become of your money? You sell something, and get a lot, and then it is gone. It is so with me, I know. But I have only to turn to my cash and back accounts, and they show in black and white where every cent went. I do not expect old farmers will change much, but, my friends, encourage your children to be business farmers, and know what they are about. They will bless you for it some day. It will be better than money for them, because a good business habit will help them to make money, and they cannot be swindled out of it, or lose it, by want of experience or by carelessness. One of my daughters keeps my cash account, and everything is all straight, and my son and all the family have been brought up to keep everything straight. They all go to the family pocketbook when they please—no asking me, as they are full grown and we are all one family. But the books must show where all money goes. If there is a shortage of a few cents, they must think till they find it—not on account of the value of the money always, but to teach them to be accurate. I do not have to enforce this. They are more troubled than I when the cash is short. They have grown up in a businesslike atmosphere, if you will excuse me for saying it.

A man need not always keep account with his crops. I found it a necessity to do this until I got settled on what would pay me best. In no other way could I have told. I do not keep account now, as a rule. Have got past the point where it is necessary. This I found true when I did keep account, that it helped me about reducing the cost of production. I was naturally figuring to grow the crop cheaper the next year. I have given you examples of how this worked, in other chapters. It was just this figuring that got up these sideboards for the wagon, so I could earn $4 a day drawing wood, instead of $2.25, or handle potatoes for half the money by using the bushel boxes. Of course, one cannot keep exact account with a crop, but he can come very near to it. Team, tools and driver, except costly tools like the binder and digger, cost me about $3 a day on my farm, and I call it that in figuring. For the costly tools I add a fair interest for their use.

Nor can one figure exactly how much the farm pays him, but he can come near it. I would not, of course, credit the farm with every mess of potatoes dug from the garden, or every load of wood or pound of butter. This would require too much labor. But one can estimate in a lump what the garden is worth, how many potatoes are used in a year, how much butter (I can tell within a few pounds what we will use in a year), etc. These articles may then be credited fairly, so as to give a good idea of what the farm really does pay. And in figuring interest on the investment one must remember that land is a very safe investment. Millions are loaned at 3 to 4 per cent., when the security is good enough. We have money bringing us only 4 per cent., and could loan it for twice that, but it would not be as safe. I believe that a little honest figuring would make some open their eyes in regard to the profit of farming. But I will say more on this point in Chapter XLI.

A friend wrote me not long since in regard to cost of team work, saying he did not see how I could estimate the wear on a horse, harness, etc. The interest on first cost would be simple enough, but he was at a loss about these other points. I may well take up a few lines to show how simple this seems to me, after years of practice. For example, I have been in the habit of allowing ten dollars per year per horse for wear or depreciation. Let us see how it works. In 1882 I paid $150 for a team of rather cheap horses in the fall. They were, perhaps, nine years old. They were not as fine to look at as our best team, but good enough for farm work. One was sent to the heaven for faithful old horses, without pain, last fall; the other we still keep. One worked nine years and the other ten this fall. At ten dollars a head a year, they have brought us $190—$40 more than cost. Our best work team cost in the fall of 1881 $380. Eleven years takes off $220, making them worth now $160. They are seventeen years old, but I would not want to take that for them. My figures on the average anyway are about right. How about losing a horse now and then? I do not know. We never have lost one that was of any value. As to harness it is not difficult to figure.

I never wear out a harness or pay much for repairing. We take good care of it, oiling, etc., and when it gets where repairs must be made often, we let some farmer who does not figure put new leather in an old harness. For example: One pair of work harness, got in the above condition last spring. I went to the shop and picked out a new set and asked cash price with best collars. "Thirty-four dollars." "What will you give me for this old set?" "Five dollars." "Take them." The old set had served us eighteen years, and cost $40. Divide $35 by 18 and you have the wear per year, and about $1.50 per year will cover cost of oiling and repairs, such as new staples, cock eyes, etc. The leather all through was the original, well worn but whole. We buy only the very best hand made, however, and then we take care of them.

After reading this over it seems to me that, perhaps, I have hardly made plain enough the practical value of the cash account in the line of showing that debts have been paid. It has saved me money many times. Let me give a simple illustration or two. Years ago a farmer moved away from this town. He owned something which I wished to hire the use of while he might be away, and did so, the price fixed being $3 a year. I usually paid him about once in two years, as $3 was rather a small sum to bother with sending every year. In time the man moved back. I had not sent him any rent money for some little time, and one day when I thought of it I wrote him to please send bill for balance due him and I would send check at once. When he met me he said he had no account of it, but was certain I had not paid him anything for over six years. I was greatly surprised, but did not say much. From my asking for the bill, he probably thought I had no account of it, and did not know how much I owed him. Well, if I had not had it down, of course I would have had to pay what he said. I went home and looked over my cash account and found the last entry: " Rent to ——— to May 1, '88, 2 years—$6." This settled the matter for me, and I knew there was another $6 back of it. This I found, as also a receipt from the man. This I sent him, and, of course, he had to offer to settle according to my books, as he had no account. He excused himself by saying it was a small matter and had gone wholly out of his mind. Far be it from me to try and make out that I am better than other farmers, but these are simple facts. I saved $12 right there by tending to small matters as well as large ones, in a simple, businesslike way. Once my cash account with a merchant who was my banker, showed $30 more due me than he had to my credit. He went over his books and insisted he was right, but from my books we were able to find his error, and the money was saved. I came near losing $200 once, however, by a little carelessness. A draft for $200 came by mail the same day that a bill came for the same amount from another party. I simply endorsed the draft over and sent it to pay the bill. The man was careless and did not send me any receipt. Years after he died, and his administrator wrote to know if I had ever paid that $200. I turned to my cash account with all the assurance in the world, but there was no record of any money sent him, either there or on bank account. I knew I had paid it, and was in a great quandary over the matter. The trouble was I did not enter either the $200 received or paid out. The two errors balanced each other exactly. Well, I had not one particle of proof that I had paid that bill. The New York firm that sent me the draft had destroyed it when it had got back to them. By the merest good luck I got out of paying it the second time. A clear entry in my cash account would have saved me a good deal of worry.

I believe nothing has been said yet about a note book in which one can keep a list of things that need doing. It will come in as well in this chapter as anywhere. It is a very simple matter, but has helped me quite a little. Of course, the large matters, like cutting the clover or the wheat, or digging potatoes, need not be put down. They will not be neglected. But there are many little matters that are easily overlooked. I find it a help to keep a list of all such. Whenever I see anything that needs doing in the field or barn or cellar, or on the lawn, it is written down. Then the work is all before me. Sometimes the work is divided into two lists, one of things that need doing soon and another of things I would like to do when there comes spare time that is favorable for the work. Some jobs may be carried along in this way for a good while before they get done. As fast as the work may be done, it is crossed off from the book. This is a small book that can be carried in the coat pocket. With the work all before him in black and white, one can glance over it and see what is the most important and can be done best as the weather is. When we may be broken off from a big job by rain, a glance over note book shows something that we can go right at at once. It is very seldom we get out of work under cover. My son and man have just been driven in from the potato field by rain. There are two things they can go right at under cover. The manure from one box-stall can be wheeled out into covered yard (I had noted down that it was about full), and the granary wants to be cleaned out ready for threshing. I must go right down and tell them. Of course, one can carry such things in his mind, but it is a relief to have them written down, and we are less likely to overlook something. Doubtless some farmers will laugh at this plan, and think it is book farming, and so it is; but, my friends, just try it a few months in the busy season and see if it does not help you. Put down everything you see that wants doing, as you walk over the farm, or as it comes to your mind. Then see if you cannot work off these little jobs faster and to better advantage than when you go at them haphazard, trusting entirely to your memory. I know a great many of you are not as used to handling the pencil as the writer, but I would get in the habit of using it more, particularly if I were a young man trying to improve my condition. This is entirely disinterested, as I have no note books or pencils to sell! Should you meet me at any of the institutes, keep watch, and you will see the note book come out when any point is brought out that I think may be of use to me afterwards, and I wish some reminder of it.

# CHAPTER XXXIV.

## NOT ALL WORK.

DO not get the impression, friends, that we live just to work. I would not blame you much if you did think so from reading the preceding chapters only, but you must take the book as a whole. It is a part of my religion to do what I do do thoroughly well; in fact, I love to do my best at any kind of work I may have on hand. But I do not believe in living just to work. Working may be carried to excess. I know farmers who get almost no pleasure out of life. It is just work from one year's end to another. In some cases this seems to be necessary, when one is in debt, or just starting, and I fear sometimes farmers get so in the habit of driving and pushing, thinking they will take a rest by and by when they get every thing all right, that it becomes a second nature to them, and they continue to drive when it is no longer necessary. Work is a glorious thing. Rest loses its charms unless balanced by active work; but in this age, with all our machinery and inventions, man should no longer be a slave to work. We ought to be able to have a good slice of recreation and pleasure as we go along through life. I have tried persistently to live in this way. This was one reason why I quit trying to do a little of everything on my farm and undertook to do two or three things well. I thought there would be not only more profit, but more time to enjoy life from day to day. I was not mistaken. I branched off into strawberry growing, raising half an acre. It paid, but I was too much driven during the picking season. I undertook to write this book, but it has interfered sadly with our enjoyment of life this summer. Rest assured, if I did not hope it would do some readers real good, it would never have been written just for the pecuniary benefit to myself. My income was ample and I had enough work to do. I am figuring now to cut down on my work next year decidedly. A man can live on a farm and have a real good time. Wife and I have worked hard for many years, and although we have enjoyed life and got a good deal of pleasure out of it in the past, we mean to get more in the future.

For many years we have began work at 7 A. M. and quit at 6 P. M., and if there was nothing pressing we have drawn in on the ten hours at both ends. I am quite inclined to reduce the working hours to eight in the future, except, perhaps, for a short time in harvest. I like greatly to have time to take a ride most every pleasant evening, after supper, with my wife, or to sit on the lawn and enjoy the flowers, or walk around and see the growing crops. We never get tired of these pleasures and never get enough. Although I am almost fifty years old, I enjoy taking my girl out for a drive, in a nice, clean buggy, behind a good horse, just as much as I ever did. And I keep a horse on purpose that does no other work. It is a real rest and pleasure to us to sail along behind a young, fresh horse that just loves to go. And I would bring up at an ice cream parlor a good deal oftener than I do, if my wife was not afraid people would think us too silly for old folks. And then, with our way of farming we can leave home for a day, or several days, often, if we wish, during the season. There are times when we must be here and push things, perhaps, for half of the time during the summer, but even then we can get a good deal of pleasure after the work is over—after 6 P. M. Now, you will remember that we could not do this way, or did not, when we began farming, but we went at it systematically to work it around until we could. Our farming has all these years had a definite aim—to live. Not merely to get necessary food and shelter and clothing, but quite a little more, and time and means to enjoy it.

Many readers, doubtless, will not think they could get along with only ten hours a day regular work for themselves and men. But my experience is that good men, when they see that they are to be well treated and given time for rest and recreation, will do as much in ten hours as in more, on the average. Ten hours of sharp work will accomplish as much as fourteen at a speed that most men will take, or must take, in order to hold out. I am not guessing about this, but know that for many years back, my men have done as much cultivating, or got in as many loads of hay in a ten-hour day, as any farmer gets done in a longer day by hired help. And I do not blame the men. If I had to get up early to milk, and work in the hay field until sundown at night, I should be obliged to take a very moderate gait, in order to hold out, and I do not believe I would hurry much if I could stand it. I should feel that I was imposed on, and it is human nature to resent this. I will employ only good men, and such will work faithfully when too much is not required of them. Men work but ten hours in town, and it is a shame if farming cannot be done on the same basis. You wonder, perhaps, why all the best men go to town or city to work now, and it is so hard to get good men. They do just as you would, go where they can do best. To get good men we must make the work as easy and pleasant as it is elsewhere, not try to get out of them more for the money than any one else does. You won't get it often if you do try. They will be as sharp as you. The writer hired a man out of a mill in a large city one season. He went back in the winter, but returned to my farm in the spring. Hired men are very human, like ourselves.

Treat them well and it will pay, besides being the right thing to do. And what is good for hired men is good for boys, too. Can you blame a spirited boy for wanting to get away from a farm, where work is pushed early and late and little or no chance for rest and recreation? The dull heads might stand it, but the brightest will not. Of course, there are chores that must be done outside of the ten hours, but I try and make these as light as possible. There is on my farm one cow to milk, and the horses to feed and care for only. If I kept a dairy, one milking would have to be done outside of the ten hours. We cannot all work on just the same plan, but we can work to make life as pleasant as possible for our families and men and ourselves, under the circumstances we are in.

In twenty years the probabilities are that farmers of my age will be dead and buried. How quickly the time will roll around! It seems but a few days since last summer and in a very few more it will be next summer. What we get out of life must be had soon. It is well to lay up something from year to year for old age, and to work hard part of the time to make money and then enjoy some of it as you go along. Take the good wife off on a pleasure trip now and then and plan to have the children go. If money is scarce, a good deal of enjoyment can be gotten out of a very little. There are cheap excursions to various points, where one can have a long ride and see much that is new. Of course, you will not go without taking your wife. She needs the rest and change of scene more than you. If money is too scarce to go anywhere on the cars, you have your horses and can go and visit friends near by with them, and have a good time. I am firm in the belief that, except in the busiest parts of the season, a farmer can accomplish as much by working five or five and one-half days in a week as by always putting in the entire six, providing he will take the whole or half day, and go visiting to some farmer friend's place, or off on a pleasure trip of some kind. This will strike some of you as a wild statement, of course, but did you ever try it? The farmer who works all the time without recreation, gets in a way of plodding along that does not accomplish only a moderate amount of work. And we cannot blame him. The bow always bent loses its power. Suppose this man takes only one afternoon and with his family goes to visit some friend a few miles away, or to some lake or grove or pleasure resort, with a basket full of good things to eat. He sees much along the road to interest him. He sees how others are doing, and that many are not doing as well as he. They all talk it over. The next morning he goes to work with more vim and in better spirits and nothing will be lost in the aggregate. Of course, I would not neglect work that ought to be done to go away for pleasure and recreation. I could not enjoy it to do this. But I would work a little harder to get necessary work done so I could go. Tell a boy he can go fishing or hunting or to the show if he gets a certain job done in time, and see him hustle. Men should be grown up boys. Recreation is good for them, too, although cares and burdens weigh heavily. There are men who carry this matter to excess, who are in town or away altogether too much for their own good. There should be a proper balance. However, the great mass of our farmers work hard enough and need more pleasure and play spells, and by systematic effort they can have them and accomplish as much or more than now and life will be sweeter.

I know some men who get along without help. Life is pretty nearly all work to them. There are so many things to do on the farm. Such men must usually grow old before their time. There is often an over-weary, almost sour, expression on their faces. They think they cannot afford to hire help. Well, perhaps, they cannot manage it so as to make it pay, or haven't been able to. But it can be done in some way most always, and I should certainly want to do it. I should prefer to do a little more, enough to pay the man, and then have him to take some of the blunt of the work off of my shoulders. Thus I could manage to get as large a net income as before, or larger, and it would not be all work. There would be more time to live as one went along. The model farm for enjoying life, to my mind, is a rather small one. Of course, it will vary in size according to the line of farming pursued. Fifty acres is large enough for my business, plenty. One hundred or more might not be too large for someone growing less concentrated crops, or keeping sheep largely. On this the young farmer and one good man goes to work. With good management, he ought to get this paid for and improved in fifteen or twenty years, so as to have a beautiful home and still have a fair share of enjoyment of life as he goes along. After a time, unless he has a son that can help, I would have two men to do the hard work, while the farmer did the overseeing and had plenty of time for keeping place in perfect order, tending to fruit garden, flowers, etc., and more and more time for rest and recreation as he grew older. And when I speak of the farmer taking life easier, I always mean his wife also. If she hasn't daughters to take some of the heaviest work off her shoulders as she grows older, she should have hired help.

A man, perhaps thirty years old, came to me once for advice in regard to buying a farm. He had money enough to pay down for a small one, and something over. He had been looking at a large farm. I advised him not to buy the large one unless he could sell part of it. He would have a hard pull to pay for it, and did not need it when he got it paid for, while he could start off comfortably from the beginning on a moderate amount of land that he could pay down for. He would be his own master then, and would just have to work to make a good living and a home. He would start ten years ahead of where I did, or more, and I know well the strain and worry of those first ten years. From my place he went to a large farmer's home, wanting to hear both sides, I presume. This man, who is as old as I about, told him to buy the large farm by all means; that he could pay the balance easy enough, and then he would have something worth while. He did so, and he worked and worked, early and late, and his wife worked as never before in her life. I do not know just how they succeeded, although I can guess easily enough, but lately they have sold part of the large farm, and now they are on the right track at last. They might have pulled through and paid for all the land in time. It would have been a hard struggle though, and entirely unnecessary, giving them little chance to enjoy life as they went along, and no more after they got it paid for. If they wanted to live and farm just to make money and lay it up, I have my doubts whether the large farm even then offered the best chances. There is a point beyond which we cannot profitably go. It varies greatly with circumstances. As the farm increases in size, the distance that crops must be moved to the barn and manure back increases, and more time is lost going to and from the work. And the larger the farm, the more skillful must be the management, to do all work on time and prevent waste and losses. Again, four men will not do twice as much as the farmer and one man, not by a good deal. The moderately small farm offers the best chance for thorough and timely culture, and hence profit as well as pleasure.

# CHAPTER XXXV.

## A FARMER'S HOME.

WHAT should the farmer's home be? First, what is a home? The dictionary says one's house, or dwelling, or residence. But this is hardly broad enough. A mere shelter from the storm hardly constitutes a genuine home in these days. Some writer has said that home was where mother is. That is good, but wife and mother may stay in a place that is far from being a true home. To my mind, a farmer's home should include not only the house that shelters them, but the comforts and conveniences in and around it that go to make life more truly enjoyable to his loved ones. I believe also that a farmer's home now isn't quite perfect without a neatly kept lawn about it, and flowers, shrubbery and trees for adornment, and a garden producing abundance of fruit of the kinds they like, as well as the more common vegetables. These things naturally belong to a home where land is cheap and plenty. The city man must often put up with 7x9 grounds and stale fruits and vegetables, but it is usually with a longing for more elbow room, and a determination to have a home in the country surrounded with beautiful things some time. To offset these disadvantages, the city man has his groceries, meat, etc., delivered to his door; he can walk or ride to church, or entertainment, or the depot, comfortably any day in the year. He is out of the mud. He has water and gas and electricity, perhaps, on tap, as well as the telephone. Many advantages are possible where homes are brought so closely together. But there are disadvantages also. Roomy and tasty and natural surroundings and choice fruits and flowers and vegetables fresh from mother earth in the city are only possible to the wealthy. It seems to be the one desire of almost every business man in the city with whom I have talked, to have some day a country home with its natural advantages which he fully appreciates. Why do not our farmers make the most of the chance they have? Life in each place has its advantages and disadvantages. Do we not make the best use of life when we make all we can of the situation in which we may be placed?

But let us come down to every-day particulars. With regard to the house itself, let it be as good as you can afford. If you are well-to-do in the world do not build great, fine barns for your stock and put money out at interest, while your family live in an old out-of-date shell of a house. It may have been quite grand when it was built, but times have changed. We should farm and live, and not live just to work and make money. I do not believe in extravagance, but a good; comfortable house with many of the modern conveniences, where one has the means, would be an investment to be proud of, and no matter how poor I was I would work for such a home and work to win, too. It seems to me a most laudable ambition, and just as right and proper for the farmer as for any town man. I would not run in debt for this under any ordinary circumstances. Better live in the cheapest shell of a house. But I would work hard and save until the neat, tasty, comfortable, beautiful home could be built and paid for cash down. We lived in the old house fourteen years until we dug out of the earth enough to pay for a better one. We lived in the new one in our thoughts a good while before we got it, and most every poor young farmer will have to do the same, and it is all right providing he isn't satisfied, but keeps steadily working for better things. As you read in Chapter V., we built a new house before we did a barn, and furnished it well, too. The welfare of wife and family was placed first. I remember my wife's begging me not to buy new furniture until after I got my barn. But I was rather obstinate, I fear, and the old barn was sort of passable; we could get along with it two or three years longer. As a matter of business, however, friends, you had better build the barn first. It will help to make money to pay for house. The new house will help you to spend money. But I should do just the same way again.

But now, be the house itself as good as you can afford or not, how about the kitchen? Is there a pump in it to draw water from the cistern or well, or both? Is there a wood shed opening out of it filled with dry wood, or coal, if you burn that? Have you some convenient and perfectly safe way of disposing of the house slops? Have you an oil or gasoline stove for hot weather? Are there doors and windows and porches to ventilate and make pleasant this room where the women on most farms spend the most of their time? Are the windows hung with weights so they can be opened easily or let down from the top? And are there screens in the windows as well as screen doors to keep out the flies in the summer time? All these things and more are necessary in order to have anything like a perfect kitchen in a farmer's home. Look around and see if you have got them all; if not, keep pushing, and never be quite satisfied until you do get them.

It is wrong to make a woman with her thin clothing go from a heated kitchen out doors in cold weather for water and wood. A pump can be put in the kitchen for a trifle. Water can be drawn long distances, practically. Some farmers seem to think that the pump must be right over the well or cistern. It is not at all necessary. The water in our barn is drawn, practically, through pipe from a well 130 feet distant. I hardly need to tell you that a pump was put in our kitchen before we had one at the barn. And once a year our wood shed is filled with dry stove wood, not too long or too coarse. In our poorest days we never burned green wood—couldn't afford to do it, nor to wear out my wife's patience.

The slops from our kitchen are thrown into a large cask on wheels that stands by the east porch, or west one, as may be most handy. This cask the man wheels away every night and empties once only in a place. This is very handy and perfectly safe. I would never risk a slop drain coming into the kitchen or up by the door outside, and slops thrown out of the door, always in one place, could not be thought of for a moment. Slop drains are usually dangerous to health. Of course, they may be trapped so as to be moderately safe, but I never saw one so fixed in a country home.

In this same line, a farmer should have an earth closet, where the accumulations are gathered in a water-tight metal box or pail, and deodorized by daily applications of dry earth. Dry muck is best when one can get it readily, but any dry soil or dust will do well. These accumulations can be emptied on the manure heap, or scattered on the surface of the soil, and will not be unpleasant to handle or endanger the purity of the drinking water or of the air. Pure air, pure water and God's blessed sunshine are the best preventives of disease in the world, and one would naturally suppose that around a farmer's home they would certainly always be found, that they would be much more certain to be there than in the cities where homes were close together. But they are not. Typhoid fever, scarlet fever and diphtheria rage in farm homes as well as in our cities, and are said to be even more prevalent. These are nearly always preventable with just a little care to have pure air, pure water and plenty of sunshine. With a covered barnyard and cement floors and a free use of land plaster in the stables, and with a simple earth closet, and slops never emptied but once in a place, on the surface, in the sunshine, you can have pure air and pure water. On a great many old farms you cannot find these now. The earth has become saturated with filth until the danger point is at hand. When our farms were first settled there was almost no risk of this kind, even if one was somewhat careless. The earth absorbed the filth. After fifty or more years of this it simply cannot hold any more on many farms, and serious danger is right close by, and no one can tell how soon it may take away one or more loved ones. It is no act of the Lord, either, no dispensation of Providence, but just the accumulated filth about your places which poisons the drinking water, and, perhaps, the air. Given a flat location and manure of various kinds leaching into the earth for many years, from stables, yards, privy vaults, etc., and a well of water from which the family drink, within easy draining distance, and you have, sooner or later, a death-trap. This was just the condition on my farm when I came here, and previous occupants had paid the penalty. One of the most promising young farmers in this county died not long ago of typhoid fever. It was not the first case on the farm, nor the last. A hearty, strong man might not be stricken down; but this friend got rather worked down and overworried, and his life was sacrificed to ignorance or carelessness, or both. And such cases are getting to be so common. One dislikes to say anything when people are so afflicted; it seems almost cruel, but the welfare of the living demands it. There is no real safety when accumulated filth is allowed anywhere about your places. Don't say it is 100 feet from your well or home; it may not be safe at 1000 feet. Don't have it at all. A doctor was telling me last winter that he was called to a house where they were having the typhoid fever, and an examination of the premises made him suspect the well water was contaminated by a cesspool that was at what was considered a safe distance away.. He got a barrel of salt and emptied in, and a lot of water, and in a short time could taste the salt in the well water. Just think what that family had been drinking, and for Heaven's sake *know* that you are not doing the same, and know it before you have lost your dear wife or one or more beloved children.

But to come back to the kitchen: That oil stove is, or may be, a great comfort to the women during the hottest weather. We have a range with six burners, but my wife generally does the washing and heavy jobs on the cook stove, but the rest of the time uses the oil stove, which scarcely raises the temperature of the kitchen at all. All work can be done on it readily, and I would do so myself, but you cannot hurry a big job as fast as on a stove. I went in the kitchen the other morning when our folks were ironing, etc., and all six burners were going full tilt, and had been for some time. I asked my wife why she did not iron out on the porch, as it was one of the hottest days of the summer. "Why," she says, "it is cooler in here." Well, I could not believe it, and got a thermometer and tried it, and found it was actually a trifle cooler right in the kitchen than on a shady porch. This in the forenoon, before the house had got heated up. It was 95° on the porch, and 93° in the kitchen, with oil range in full blast. Think of that, you women who were then roasting over a cook stove. We can bake bread, or do anything, over the oil stoves, and, practically, without any bad odor or taste to the victuals. We have for several years. But we use only the very highest grade of oil. As we use oil for lighting, it is more convenient to use the same fluid for the stove, rather than gasoline. And then oil is far safer than gasoline—in fact, just as safe as wood. I have never yet heard of any accident with a first-class oil stove and the best oil. Gasoline is all right, like nitroglycerine, if—but to make mistakes is human, and no fluid as dangerous as this can come into my home. Lives are constantly being lost by its use.

Screen doors and screens for the windows are among the conveniences that one can hardly do without nowadays, both for the kitchen and all the rest of the house. Flies are good scavengers, but they are very annoying to the good housewife, and cause her much extra trouble in the way of cleaning up after them. Every door and window in our house has a screen in it. I am writing now in our room (wife and I) upstairs, in August, and not a fly in the room—perfect comfort. I would not like to go back to flies again—on my head, all over the victuals, on the table, etc. What a comfort it is to sit down in the house with no flies, and sleep with no mosquitoes in the room! But I have known farmers who had nets to keep flies off of their horses when at work, who thought it extravagant when the wife wanted some screens to keep flies off of her when she was at work in the kitchen. It would not do to say they thought more of their horses than of their wives; oh, no!

Some rooms can be shut up, and, by keeping them dark, the flies do not come in. Wise flies! May we not learn a lesson from them? They know it is not a healthful place—in a dark room. Instinct teaches them what we, with all our boasted wisdom, sometimes do not seem to know. Far better buy screens, and throw open blinds and shades, and let in the bright sunshine, at least part of the time, and, with it, health, happiness and good temper. Where house plants grow spindling and do not flourish, even close to the windows, getting all the light there is, we humans expect our families to thrive oftentimes. This is bad enough for grown people, but far worse for little children. It is well, perhaps, to close the blinds in the heat of the day in summer, but for perfect health the sun should shine into every room in the house a few hours, at least, morning and night of every day it comes out. I know how ladies object to this. They say it will fade the carpets, and fear, perhaps, too healthy a tinge on their cheeks and hands. Never mind the carpets and furniture; the best welfare of human beings is more than these. Give us bright, cheerful rooms to live in always. It will help the temper as well as the health. Rheumatic troubles have been cured by simply sleeping in a room where the sun shone in all day, and there can be no better preventive than a sun-bathed bedroom, as well as living room. I would *never* have large trees standing near the house, so as to shade it and keep sun out of windows. Give me, first, a dry location, well drained, naturally, if possible—if not, then with tiles,—and trees, and shade about the outskirts of the yard and house so arranged that the sun can find its way into every room, more or less, every day it shines. There are four large windows in the room where we sleep and I do my writing. Two are on the south side, and one on the east, and one on the west. This give a chance for sunshine and air, too. And when I am up here it is always bright as sunlight can make it. And how nice during summer nights! With these big windows wide open, and a screen in each one, it is almost like sleeping in a tent.

But now let us go into the front part of the house, the living room, sitting room, parlor, drawing room, or whatever you choose to call it—the place where you sew, read, receive visitors and where the family gathers at night. When I was a boy they had a room they called a parlor, which was opened up when the minister called, or they had a funeral, or on some other great occasion, but never was occupied by the family when alone, nor when neighbors dropped in. And these places still exist. Yes, the writer has been honored (?) by being put into one now and then, of the real old, cold, gloomy kind. No farmer's home now needs any such room as this. There is no room in our house too good for the family to occupy during the winter evenings, or on Sundays, or any time when the day's work is over and we have on clean clothes and slippers. The family should be just as good as company, and then when company comes make them at home with the family, not make them feel that you have gone to extra trouble on their account. Of course, in our old houses we must get along the best we can as they are built, or can readily be altered over; but if building a new house, by all means have the living rooms open together with large double doors. Thus one large stove centrally placed can heat one, two, three or even four rooms, as you may please or need. It makes a house wonderfully homelike and pleasant, and is quite a saving in labor in the way of building fires and keeping them up in separate stoves. The old way of a stove in most every room was no end of trouble. I have seen too many houses where four or five fires were kept up. The new way is far better. In the plan of our home, you will see just how we do this and nothing could induce us to go back to the old way.

Having the rooms, how shall they be furnished? Why, according to your means. It is entirely right to delight in pretty things and take comfort when you can, and easy chairs and nice furniture are all right if you can afford them. But do not have them too good for the family to use, no not one single article. This keeping nice furniture all covered up in a dark room for extra occasions is not homelike, to my notion. You may even cover your floors with body Brussels carpets, if you like. We have, down stairs, in every room but the kitchen. They are the cheapest in the end, anyway, and no dust goes through them. A carpet sweeper passed over them lighty takes up the dirt and saves the ladies much work. We put some tobacco around the edges every spring to keep moths out (our screens help to keep millers out), and do not need to take a carpet up for years. Not a particle of dust can go through them. I would have a Brussels carpet in the kitchen, some plain pattern, if my wife would let me. In time I shall triumph, I think, for she used to declare she would never have anything there but a rag carpet, and they would cut and sew rags, making about a cent an hour, instead of reading or resting. I don't believe in that sort of work. I won't do it out doors, and I preached it to my wife for years, but old practices die hard. But, friends, last winter when I was gone she did put down some second-hand ingrain carpet in the kitchen! By the way, the above is the only use for tobacco we have, and I rather think the saving in the last thirty years would pay for a good many home comforts. We might afford both now, but never shall. Tobacco and drinking, which is quite apt to follow, has kept many a man from having a nice home. My young readers, avoid these two evils as you would the smallpox, and when you get to be my age you will thank me. A young married man with two pretty little children, told me last winter that he had to give up a farm he bought after trying some years to pay for it. He was just about to move into town. There was a sadness in his wife's eyes that was hard to see in one so young and pretty. She almost cried as she told me how she disliked to leave the farm. Her husband was secretary of our institute, and I saw a good deal of him for two days. He came in early and staid at the hotel with us, and there was hardly an hour of the day when there was not a cigar in his mouth. I believe he smoked ten at least per day. When the institute closed the last afternoon his wife came to the hotel with her children and urged him to come home with them. But, no, he must stay and see us off. I protested and tried my best to get him to go, but, no, he must stay, and immediately a cigar was lighted. When it was train time he lit another and went down with us. Shame on a man that will spend money in this disgusting way that is needed to make a home for wife and children, and give them every comfort that money will buy.

But, however you may furnish the living rooms, let them be cheerful and bright day and evening. Artificial light is very cheap now; do not try to enconomize in its use. I have just bought a barrel of the highest grade of oil made, which, after returning the barrel, costs me just six and one-half cents a gallon. I can well afford to make my home bright and pleasant in the evening. Have a powerful hanging lamp of sixty or eighty candle power, so every one can see to read with ease all around the room. And then have the table well covered with papers, magazines and books, some that will suit the children as well as the older people. Such things are so cheap now. Even these cheap pleasures may be beyond your reach at present, but work for them, as they are wanted in that perfect home your are striving for. If you, my older friends, were not brought up to read much, you should give the children every chance in this line. Papers and books move the world nowadays.

There is one more room in the house that I want to speak of in particular, that is the bath room. A farmer and his family can hardly have a greater comfort and luxury than this, during the hot weather in particular. A room devoted to the purpose is not necessary, although convenient. We have a six-foot copper (tin lined) bath tub in a store room up stairs, the waste pipe running down and out doors. We put in a pump to the cistern, but do not use it much. The men and myself in hot weather enjoy greatly taking up a pail of water warmed in the sun, or cold water from the cistern with a little hot water in it from the reservoir on the stove, and hastily bathing after our day's work, and getting on some clean clothes for over night. It is very easily done and a real luxury. We have a stove in the room for cold weather. The tub stands in a corner of the room out of the way, and the only cost was what we paid for it and the pipe to lead water away.

But let us go out doors a little while. Is your yard nicely graded and seeded? If not, fix it next spring and sow blue grass seed. A little timothy with it will furnish an immediate sod while the blue grass is getting started. Then get a lawn mower and keep it nicely cut the season through. Nothing is more beautiful than a nice, velvety, green, well-trimmed lawn, at least this is the foundation of all the beauty of our grounds. Many a farmer has built a good house and then failed to fix up around it properly. The house is all right but it wants suitable grounds, too, to make a beautiful home. And then they want care just as much as the house wants paint. Neat, tasty surroundings will cost quite a little work, but not much money out. It takes one full day's work or more each week during the summer to keep our lawn and walks, flowers, shrubs, etc., in order. But often this is done right after a rain when we could not do anything else. I am proud of my home, although it is nothing wonderful at all, and I respect myself and family enough to want it always neat and tidy. Even if in debt I would spend a little something each year in improving the home grounds. This is work that cannot be done in a day. It takes many years, and it is well to commence early in a small way. For myself, I would not want a place all fixed up perfectly at once if I could have it so. I like to be improving from year to year. Let the place grow along with the man. Nor would I have all places fixed according to the same iron-clad rules of landscape gardening. The great beauty of Glendale, near Cincinnati, seems to me to lie largely in its irregularity. No two places are alike. This fault I must find with the far-famed Euclid Avenue of Cleveland; there is far to much sameness. Every place is fixed just about so—open lawn in front, drives at the sides and trees in the outskirts. Why, it was a real relief to me to come to a place when I was walking down the avenue where some original mind had set out a great long bed of geraniums nearly in the centre of the lawn. Never mind about fixed rules. Fix your place to suit yourself. Let it reflect your taste and skill, rather than be an exact copy of some other. Lay out walks in easy curves rather than straight lines. Avoid all stiffness and too much regularity. Trees and shrubs never grow naturally in straight lines. You need a few bright flowers for contrast, but my notion is that a farmer better depend largely on hardy flowering shrubs and vines and perennials, rather than on annuals. This is the way we have tried to do. We want beauty that comes with the least care. And while I think of it, don't get your grounds too large. A little lawn well kept will be more attractive than one that you haven't time to attend to in time.

But be the grounds ever so neat and well kept, they will never be quite perfect without the small fruit garden. Don't forget that. I will tell you more about that in another chapter.

There are ever so many more points I would like to speak of, but I will just take one more and then give you a rest. The town man's wife can easily walk to visit her friends, or for recreation, or to do her trading. The distance is short and they have sidewalks. In the city, where distances are greater, they have the street cars to ride on. They are not tied up at home by their husband's business. Is it so on the farm? Yes, when the wife has a horse and buggy for her special use, a low, easy phaeton that she can get out and in alone handily, and a horse that is always at her command. This cannot be afforded often, particularly at first, but it will have to come before you get a farm home that is just perfect. Work for it. In good weather farmers are apt to need the farm horses and in bad weather your wife and daughters cannot well go out. Fix them out with a nice little rig as soon as you can. Now take a little rest and then we will look over my home.

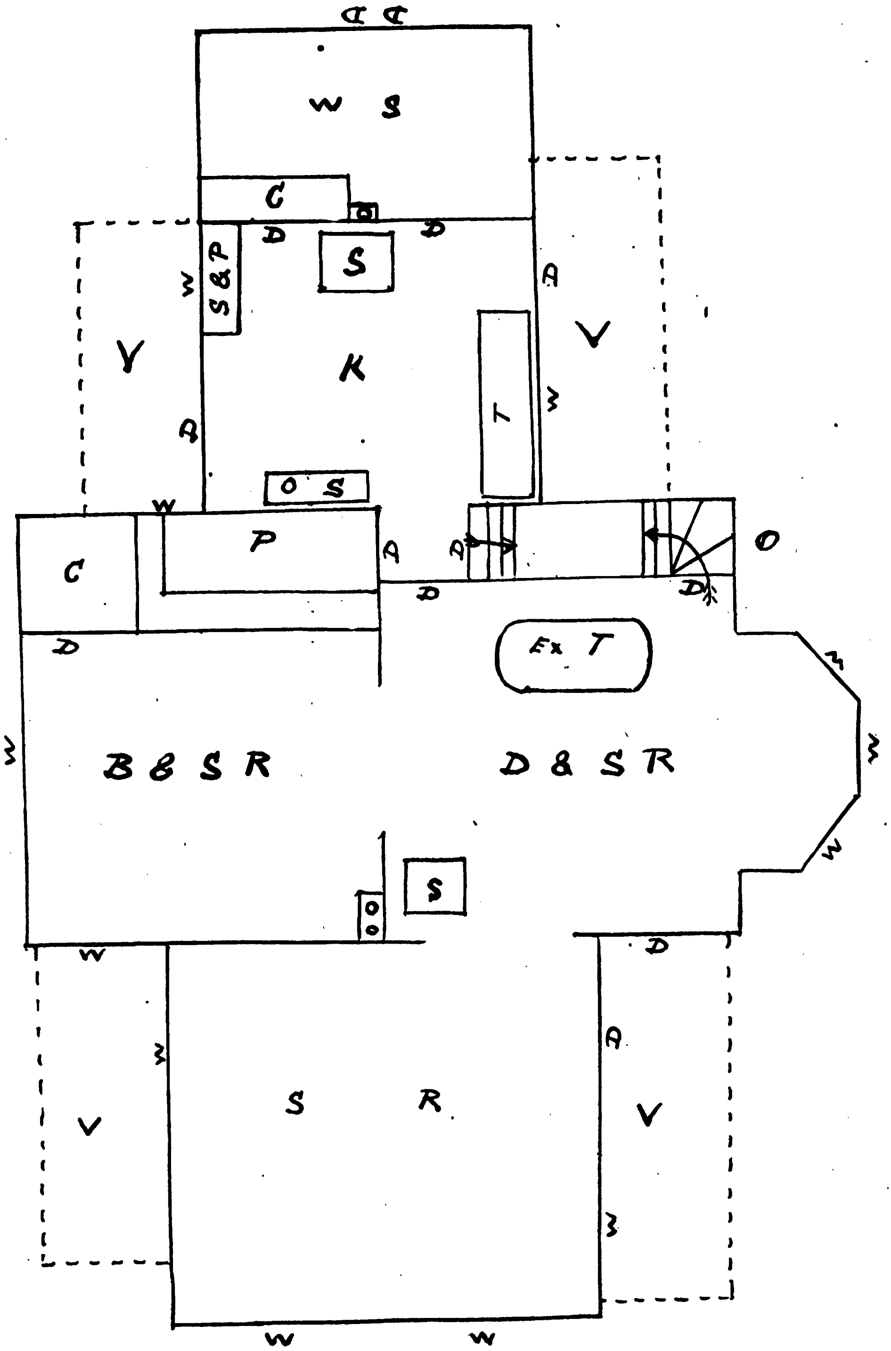
# CHAPTER XXXVI.

## OUR HOME.

LET us look over the ground floor plan first. The letters used will suggest what they stand for, so as to help you. Beginning at the front we have the sitting room, or parlor if you wish to call it so, marked S R. It is a large room 16 x 18 outside, with a veranda (V) on each side. There are four large windows, one glass in a sash, 26 x 40 inches (see picture of front). The house faces nearly south, the verandas or porches being on the east and west sides. The window opening on west porch goes up out of the way, both sashes, so one can walk out on porch. All windows in the house above and below are hung with sash weights. The door onto the east porch is partly glass. This room, as you will see, can be made very bright. The vine-clad porches on each side help to make it pleasant (see one porch in picture of front).

Passing back through the large double doors (6 x 8 feet) we come into the dining and sitting room. This is the room we eat in, not when we have company only, but every day, right in the very best part of house. When we come in to meals we naturally sit down in this room, if they are not quite ready. Notice, there is plenty of room. You see where the extension table (Ex T) stands. As the room is nearly twenty feet long there is a chance for plenty of rocking chairs near the bay window and around the large stove (S). The door onto veranda from this room is also glass. This with the three large windows (glass 26 x 36) makes this room also very bright. In our old house we had a dining room with one east window and one north, both small, and one under a veranda. It was a dark, gloomy room at the best, some days seriously so. We determined this east room should be well lighted. Of course, this bay window is well filled with flowers in the winter. It makes a splendid place for them. Following the curved arrow you pass up stairs by quite an easy rise. There is no hall in the house below. We did not want any. Our house is built for comfort and with a due regard to economy. The main entrance doors are on the southeast side, you will notice, the sheltered corner.

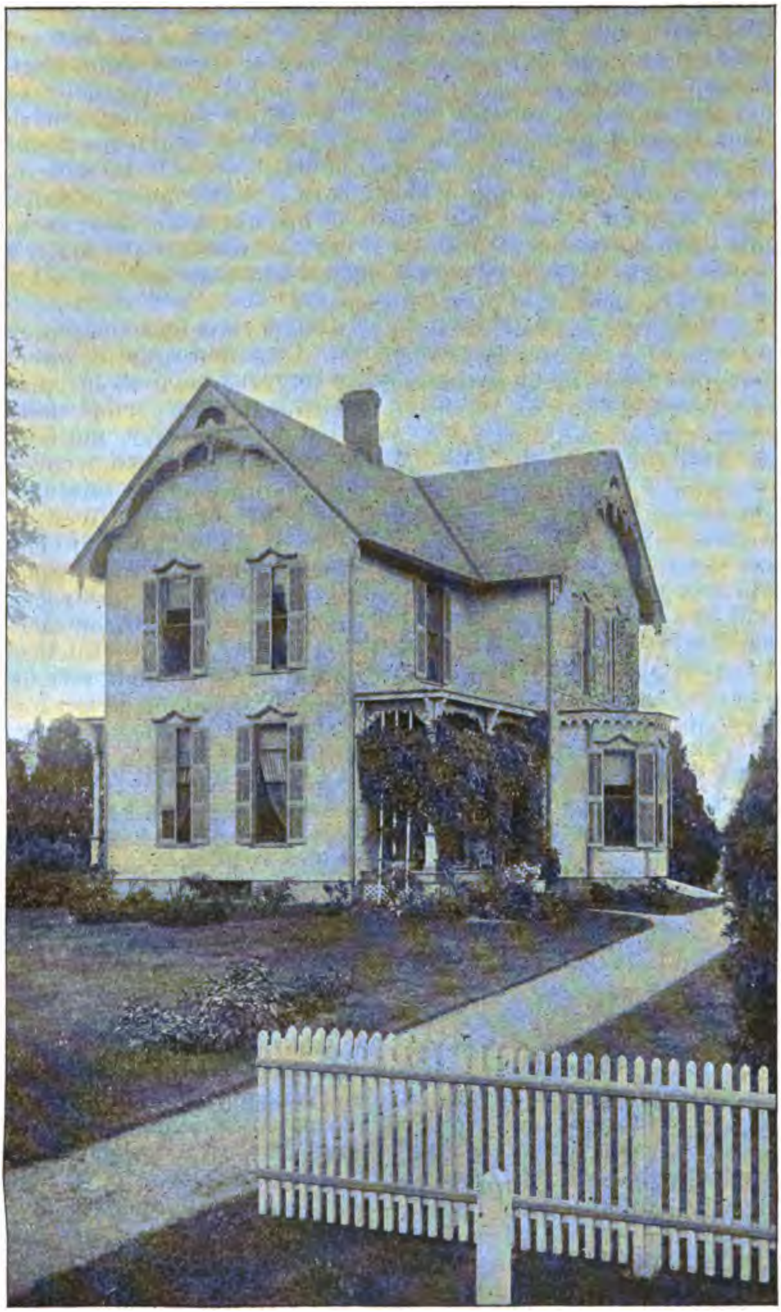
Pass through another pair of double doors 6 x 8 feet to the west, and you come into what you would take to be a sitting room, perhaps, and so it is. We all sleep up stairs. The air is purer above, anyway, and we all prefer to sleep there. But in case of sickness, or when we get older, we may prefer to have a bedroom below. Also, it comes handy, sometimes, when one has company. So this room is arranged so it can be turned into a bedroom in one minute. A folding bed stands up against the front room wall. It is ornamental when not needed, and always ready. For a centre table in the room we have a curious combination got up by some inventive genius. Not one person in a hundred would ever dream it was anything but a handsome centre table, but by simply lifting a lid you find wash bowl, and pitcher, and slop bucket, towels, soap, etc., and a large French plate glass mirror to dress by. Our folks use this room to sew in, the machine standing in there. It has two large windows, the one onto veranda being built to go up high enough to use it as a door. Notice the large closet C. Now, you have been around the living part of the house. You see these three rooms are practically all one, with the doors open. It makes just as nice a home as we could devise or want. The large square base-burner anthracite coal stove stands near the corner of the dining room, but notice, it is almost exactly in the centre of the three rooms. It will warm all three perfectly, or two, or one, as we may desire. This is the way we manage: At night when we go to bed (not until the evening is passed) we shut all the double doors, thus keeping only dining room, where flowers are, warm all night. In the morning we eat breakfast before opening double doors in very cold weather. In moderate weather the doors into bedroom are not shut. After breakfast, while our folks are stirring about, in the kitchen and up stairs, the dining room is well aired, and then double doors all thrown open and house all warmed. With all this room I feel as though my wife and daughters could hardly suffer from poor ventilation, with the house thoroughly aired every morning, and sometimes oftener. We can warm the entire house in the coldest weather, but except on extremely cold days we do not always try to. The saving of coal when it is below zero and blowing hard, seems to my wife more important than warming more than two rooms. A fire is not kept up in the kitchen (K) all the time in winter, but the door is left open and the big stove keeps that room partly warm, also. I never start into the winter with less than seven tons of coal (have eight now), but in as mild winters as we have had lately, we burn less than six. Our house is covered with building paper, and is quite warm. The writer has visited homes that were warmed in every known way. There is no plan in existence that seems to him as perfect and homelike and economical and cheerful as this. A furnace would ruin our cellar for keeping vegetables, and how much real pleasure is there in sitting around a hole in the floor to get warm, where you cannot see any fire? Grates, where one can look at the fire, and a furnace to make warmth will do, but look at the cost. Steam heat gives no ventilation. I have been in fine city homes warmed in all



Ground Floor Plan of House.

these ways, when things did not go right. I have sat and shivered by the hour, time and again, politely saying I was quite comfortable, when the furnace fire had got down and it took hours to get the house comfortable again. You must remember, I have been around a good deal, winters, and I always come home thinking there is no plan any pleasanter than ours. With us it is always warm near the stove, and one can see the glowing coals, which helps. If too warm there he can get a temperature to suit in some part of the house. The anthracite coal fire is a luxury. The room is always warm at any hour of the night. There is no smoke and practically no dirt.

Now as to lighting, we have a powerful lamp hanging over the extension table in dining room, said to be eighty candle power, and good lamps hanging in each of the other two rooms, and then several brass hand lamps to run around with. Thus these rooms can be made about as bright by night as by day. But now we must go back to the working part of the house. Study over this plan of kitchen and see if you can improve on it. At first you may say it is not large enough (12 x 14 outside). Well, it was built for a work room, not to eat in or sit in. Will it help any to have a large room, and just so much further to travel from stove to table, or to pump or pantry? Our idea is just room enough and no more. Then kindly notice the verandas on each side with a door and window opening onto them. A perfect kitchen in hot weather would be simply a tent that protected from sun and rain, while allowing a free circulation of air. I mean perfect for the health of the inmates, not, perhaps, for the whiteness of their complexion. See how near this comes to this ideal, in connection with the verandas. Our folks wash on the west porch, under the vines, cool and shady in the morning. There is a current of air through our kitchen, if any is stirring, and the heat is not carried into the body of the house much. But now look at the chance for doing work with the fewest steps. T is the table, a long one; O S, the oil stove; S, the cook stove; S P, the sink and pump; C, a closet for ironware and other things. Just back of the oil stove is the pantry, with cupboards enclosing all dishes, etc. Right across from the pantry door we go down cellar. The wood shed (W S) is right back of stove, and no wood box is needed; just open the door and get wood and put right in the stove. In fact, the wood shed is little more than a large wood box; but it holds enough to run the cook stove through the winter. We cook on the oil range in hot weather, which makes us need less wood. Please notice how close together are the table in the kitchen where work is done, the cupboards in pantry and the table in dining room. How could they be more handy, and still they are entirely separate. Shut the dining room door and you have all the working part of the house together and close together and apart by itself, except when the table is to be set.

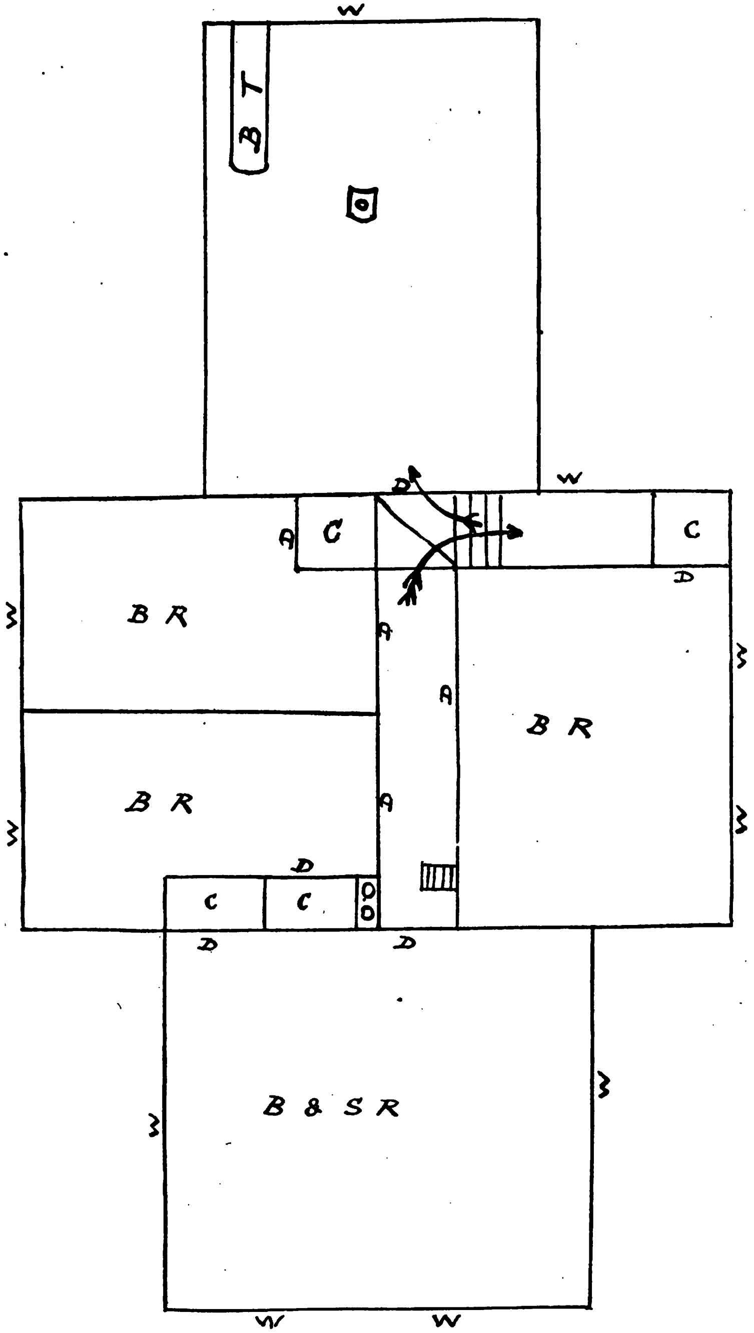


Front View of Our Home.

The pantry is in the coolest corner of the house. The sun can only get to it just at night, and then only shines on the window under the porch.

We have a cellar eight feet deep under the three front rooms. This is cellar room enough, but still I would build one under kitchen also if I had it to do over. The cost would be little more, and then, for one thing, I could have a dumb-waiter running down from the kitchen into cellar. This we cannot have now, and there is no place for it in the pantry or dining room and we have to go without it. I would make this change and one other if building again, otherwise we have everything just right now. I would make the wood shed slightly larger next time and put in a cheap back stairway to room above. Once in a while it would be pleasanter to go up that way when company happens to be in the dining room. We can make these changes now, and possibly may. Wife and I studied over the plan day after day, until we got everything else just exactly right. Every door and window is just in the right place. It was no small job to do this, and then to see that the plan was exactly followed by the carpenters. I came in once, and found they had made a slight mistake in the cellar stairway opening in floor that would take off a hat from a tall man when he went down. The carpenter said: "Oh, that will be all right. You won't often have a hat on, or can just stoop a little, etc." I said: "No sir. There is the plan. It is your mistake. I will not dodge all my life; out with it and fix it right." He looked just a little sour, but found we knew just what we wanted and would take no hit-or-miss work.

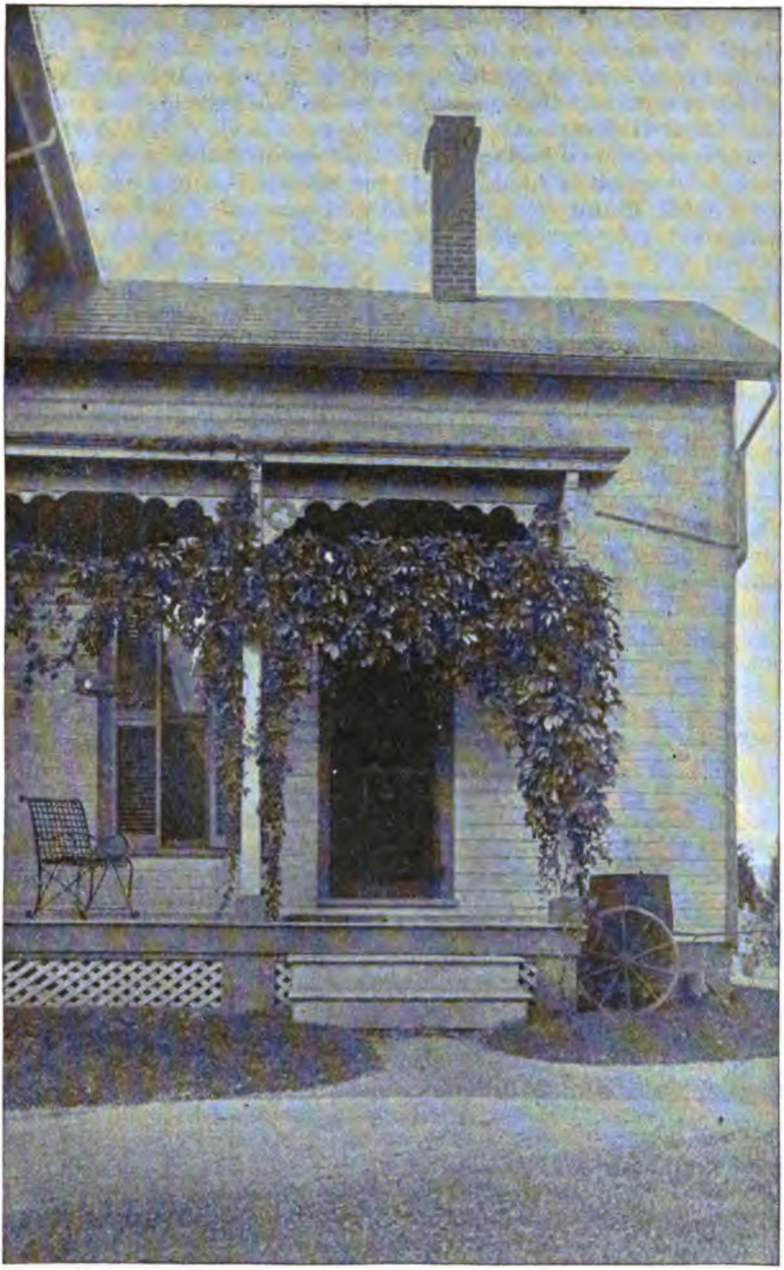
The outside cellar door is at O, just north of the bay window. We store our coal in the bay window in cellar, close by the foot of stairs. Of course, the men fill the stove morning and night. Our cellar is built of hollow bricks. They make a very nice cellar wall. No banking up of windows even is ever required. The east window where coal is thrown in is seldom shut. I believe I have spoken of it before, when writing about storing potatoes, but it will not do harm to repeat that where vegetables are stored in the cellar, one wants to fix it so the air cannot be drawn into the living rooms above. It will come through a single board floor. As the fire takes the air out of a room, it will be drawn in some from the cellar. To make sure that ours would be safe, we plastered it overhead and covered floors of the rooms with building paper well lapped under the carpets. *No* air can be drawn up, foul or otherwise. Air brought in must come from out doors. This is a matter of not a little importance. Of course, a cellar should be kept clean and pure, and no decaying vegetables in it; but things will be overlooked sometimes. To make us doubly secure we have the cellar ventilated by a flue running to the top of the chimney by the side of stove flue, which warms it and creates a draft. See the corner of bedroom back of dining room stove.



Plan of Second Story.

The cellar also has a cement floor. Now for the plan of second story. In front is our sitting room and bedroom, wife and I, and my office. We have a fire in here, of course. We now burn wood, but are thinking of changing to anthracite coal. Notice the four large windows. The glass above are 26x34. To look right, attention should be paid to proportions; 26x40 for parlor windows, 26x36 for rest below, and 26x34 for up stairs seem to us perfect for a house of this style. Passing back you see a hall with one bedroom (B R) on east side and two on the west side. In each, as well as in our room, there is a closet (C). There is a register in this hall over the big stove below. By keeping this open in cold weather and giving the stove full draft, we can warm up stairs sufficiently for sleeping rooms. There are transoms over the doors into these three smaller bedrooms to allow of a free circulation of air when doors are shut. The rear room over the kitchen and wood shed is not full height. We had no use for this room only as a store room, and it would be rather warm in summer anyway, so we built this part only story and a half high. The lower part of main house is nearly ten feet in the clear, and nearly nine above. The kitchen is something over eight feet in the clear, so we get a pretty good room above. By the arrows you will see (at end of hall above) that we pass into store room after going down two steps from the hall. In bad weather in the winter we hang clothes in this store room to dry. Notice the bath tub (B T). We keep our year's supply of flour, soap, beans, coffee, tea, etc., in this room. We have a stove to warm it when we wish to use bath tub in the winter. A small window lets light into the stairway. There is not a single change we would make in our house up stairs.

The house complete, including bath tub, cistern and pumps, thorough painting and inside finishing, paper hanging, etc., cost fully $2,500. It might, of course, be built much plainer and cheaper. We have outside blinds all around; rather prefer them to inside ones. The roof of main part is half pitch. I will try and get you a picture of one kitchen porch, and also of the shaded and almost concealed earth closet. This latter cannot be seen at all by anyone going by in the road or in the fields or from any point except from the rear of the house. It only costs a little to make such shaded retreats, a few cents for shrubs and trees and a little care. The rear yard is entirely sheltered by a solid wall of evergreens from cold winds. This includes the walk to earth closet and the place where clothes are hung out on galvanized iron lines that are never taken down. As carefully as our earth closet is managed it might safely be right against the house with an entrance from the porch or wood shed, but a natural fitness of things would suggest that a shady nook a little ways off from the kitchen was more appropriate. And a little fresh air will do even the women no harm, with proper precau-



The Kitchen Porch.

tions. We have a dry gravel walk from kitchen door to earth closet. The building itself is entirely tight, no draft; tight below as well as above. Yes, and it is carpeted. I think I had better give you a plan of this, as, I assure you, it is neat, complete—as one visitor said, civilized.

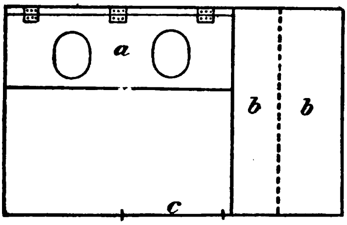


Fig. 1.

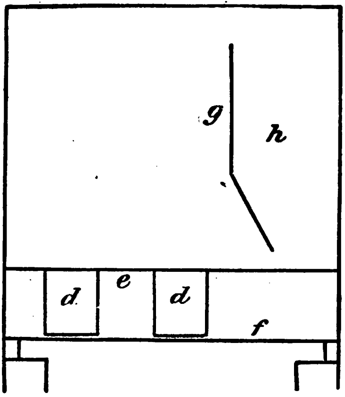


Fig. 2.

Fig. 1 shows a cross-section of earth closet at top of seat; *a* is the seat which is hung on hinges so as to lift up; *bb*, on the same level, is the bottom of earth or muck box; *c* is the door which swings around against muck box. Fig. 2 shows a perpendicular section lengthwise through the centre of seat. You will notice the earth box *h*, which runs clear across from front to rear over *bb* (Fig. 1). The front of this box (*g*) falls back at the lower part and doesn't come down to bottom, (*bb*) by some inches, as you will notice. This for convenience in shoveling out the muck. The muck rests on the back part of *b*, while from the dotted line forward we have a shelf to shovel on. The muck is put in over the top of *g* with bushel boxes or baskets, filling space *h* to roof. It will hold thirty to forty bushels, plenty for a year. We fill it once a year during some dry time in the summer. We have enough stored in barrels in the tool house, up stairs, to serve us one year, in case of a very wet season. Dry muck is what we use, and nothing can be better. Dry earth will do, but is heavier. A little fire shovel lies on *b*, with which we handle the muck. With the peculiar construction of *h* it can all be got readily to the very last shovelful; *dd* are galvanized iron pails. They are 14¾ inches high (seat 15), ten inches in diameter at the bottom, and thirteen at the top. They are made of the best iron, painted besides, and have handles that shut over outside of pails. One can lift the lid *a* (Fig. 1) or *e* (Fig. 2) readily and take the pails out and empty where desired. The pails are largest at the top for ease of emptying. The floor *f* goes right across the building, all tight. Size of building is 4½ x 7 feet. The muck-box arrangement is, so far as I know, original. For the idea of using pails I am indebted to some gentleman who gave his experience

The Earth Closet Corner.

with them in *New York Tribune*, some years ago. At once I said that is neat and perfect, and I will have them in use soon. My first step up was to saw an oil barrel in two and use the two halves to prevent any soakage of filth into the earth, and muck was kept in a barrel in one corner. It was not handy. The tubs were hard to empty. A tight box to be drawn out by a horse would be better, but a metal receptacle is perfect, absorbing no filth. I know thousands will think this too much bother, but it is a perfectly safe, clean, odorless, civilized way, with which we are entirely satisfied. This closet is for the ladies, of course. In the picture giving the inside view of covered barnyard you see the closet for the men, built on the same plan, only with one pail. Being under the yard roof, no roof was needed on the closet, so cost was little. We find it a luxury to have a place for *everything*, and everything in its place.

Now let us talk a little about the lawn. In order to get ours well graded, we dug it all up and cultivated it all summer, seeding in the fall heavily with blue grass and a little timothy. The timothy made a sod we could mow early the next spring, and gradually died out as the blue grass came in. It was several years before we got a perfect sod. After the sod was established, we cut out the drives and paths, drawing the sods away and filling up with gravel. The soil around the house, coming out of cellar, not being the best, we dug out some beds for flowers and shrubs a foot or two deep, and drew in choice soil from clover field, from some low place where it was over rich. A good deal of time was spent grading and fixing our grounds, small though they are. The shrubs, plants, etc., bought, came direct from a large, reliable nursery.

Although a beautiful green lawn is the foundation, it needs flowers, trees and shrubs, too, although not too many. The most showy flower bed on our grounds this season is some thirty feet long, and narrow, in a place where that shape would look best, and with an evergreen background. The bed is filled with a beautiful assortment of hardy perennial phloxes. They were set some fifteen inches apart each way. The plants cost about eight cents each, and were put out in the spring early. They were given rich soil, and surface was kept constantly stirred with a pronged hoe about an inch deep. They live right along from year to year, but need taking up and dividing after the second year. Ours are now two to four feet high, and a mass of the most brilliant bloom and gorgeous colors. The flowers last for a long time. Great improvement has been made in varieties of late.

We have also a bed of herbaceous peonies, of different colors, no two like, that is very showy in its season, although the flowers do not last long. These also live year after year. Among the flowering and variegated shrubs the rhododendron stands at the head for beauty of flower. With them we have azaleas. But these are rather expensive and require considerable care. For beauty of foliage and flowers, too, with little care two shrubs stand at the head—hydrangea paniculata grandiflora, and the wiegelia rosea nana variegata. The different altheas (rose of Sharon), and spireas are among our best shrubs. The prettiest pair of little dwarf shrubs, we have are spirea bumaldi and spirea collosa alba. One has delicate pink flowers and the other white. For yellow-leafed shrubs for contrast, we have the Philadelphus aurea and spirea opulifolia aurea. The first is small and neat, the latter large and rather coarse, but good color. We have two more beds that are particularly fine. One is eight feet in diameter (round), and has one plant of helianthus multiflorus plenus in centre, and five around in a circle. With rich land and high culture these make a fine show. They live over in the ground, but need dividing every spring. Last year we put a dozen plants in a bed. They were too thick. This year they are grand, filling the bed solid now (August) with foliage and beautiful yellow flowers as much again as any dahlia, and three or four inches across. With good care this makes a striking bed for the lawn at small cost, and the flowers keep coming out for a long time. Of course, these flowers, and all others, should be cut as soon as they begin to fade, and not allowed to go to seed.

The other bed costs more, both in care and for plants. It is about eight feet in diameter, also, round and exceedingly rich. In the centre are four cannas, discolor gigantea, and then around them are eight cannas (Dr. Gromier), and lastly around the outside twelve plants of caladium esculentum. We get the plants of a nursery each year, about June 1—not till hot weather. They want no tillage, as roots grow right at surface, but mulch top with manure, and water almost daily, and often pour liquid manure under them, and the growth in hot weather will be wonderful. I have never seen a bed in Cleveland that was as showy as ours. The centre is about seven feet high now (August 15th), and enormous leaves. The bed is almost a perfect oval. But these tropical plants want great quantities of water, manure, and heat. Many people drove down from town to see this bed last season. We had thirty-six plants in it then, but fewer seem to do as well. It would be a wonder to many what a number of great beautiful leaves of different colors can be crowded into so small a compass. The bulbs cost about ten cents each, by express. We have not tried to keep them over.

Of course, we have a bed of geraniums every year, and numerous other flowers, but we are depending mainly on hardy perennials like the phlox, helianthus, peony, etc., and flowering and foliage shrubs. The Gaillardia grandiflora we find a beautiful perennial flower, and then there are the odd Yucca and hyacinthus candicans, and the gold banded lily of Japan, all hardy, living over in the soil with a little mulching—but I must stop.

A word of explanation of pictures. You must remember that the camera has a tendency to draw things up together. Our house stands back further from road than you would think from picture.

In the picture of earth closet corner, you will notice the gravel driveway with house to the left. A gravel path leads to earth closet along between the little dog and the hydrangea bush.

Don't fail to notice the slop barrel on wheels by the kitchen porch. Our premises are as clean everywhere as where you see in the pictures. There is absolutely not one stinking or filthy or dangerous place anywhere about, rear or front.

# CHAPTER XXXVII.

## THE SMALL FRUIT GARDEN.

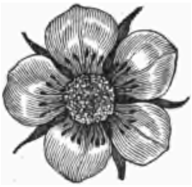
I HAVE tried to show you that a farmer's home is hardly perfect without this; now how shall he manage it? First, he must decide whether to shut the hens up in an enclosure or enclose the fruit garden. If enclosed, it may be with the vegetable garden. We have no hens, so no enclosure is needed. On account of ease of cultivation, a plot longer than it is wide would be better than square. There should be ample headlands so you can turn a horse around readily. Horse culture must be used, and most of the work must be done in this way, quickly and cheaply. With proper tools and systematic effort, it will be a source of profit and great pleasure. Wrongly arranged and managed, it will soon be neglected and considered as costing more than it comes to. An eastern or northern exposure or level land will be rather better than that sloping to west or south, because cooler. Berries want coolness and moisture, but not wet land. It should be well drained. Do not select a low place as it will be more subject to frost. A late spring frost may injure the yield greatly. High and cool and moist, but not wet, and rich land is just what is best. Come as near to it as you can. It will be best if you can select land that is quite clean. Chickweed, purslane, etc., will make much trouble; however, they can be kept down. Avoid setting strawberries on any soil that has white grubs in it. They will eat the roots and destroy the plants. While partial shade will do for raspberries, it will not do for strawberries, as shade means tree roots in the ground to use up the moisture. Now, how much land will be needed? To allow for rotation of strawberries (they may well be rotated with garden crops and seeded with clover once in three or four years), and give a great abundance of all kinds of small fruits, from half an acre to an acre will be required for most families. For our family of six or seven persons we would want a piece of land, say, about 8 rods by 16. Beginning on one side, I would have four strips, each a rod wide, to rotate strawberries and garden crops on. Then the rest of land I would have occupied by rows of currants, raspberries, etc. Beginning at the second year this is the way it would be found:

(1) Bearing bed of strawberries.
(2) Newly set strawberry bed.
(3) Clover.
(4) Vegetables.
Currants.
Black cap raspberries.
Black cap raspberries.
Red raspberries.
Shaffer raspberries.
Blackberries.
Blackberries.

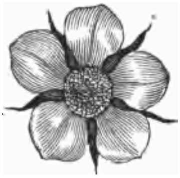
This would give us just about the right quantity of each kind of fruit. The next year the bearing bed of strawberries (1) would be in clover. I would plow bed under as soon as I was through picking and sow clover seed. Harrow ground down all fine and firm when it is moist and sow seed and roll, and it will come up and grow nicely, at least mine does. It falls in the little harrow marks and the roller covers it just right. The easiest and best way is to set out a new strawberry bed every spring. It is easier to care for a new, clean bed than the old one, and you get finer berries and always have the best plants to set out then. The next year (2) would be the bed to pick, and sow clover seed on after the season is over. (3) Would be in vegetables. Manure the clover if needed and plow under for the garden stuff. (4) Would be the newly set strawberry bed. Strawberries would be set each spring on land that was in vegetables the previous year. This rotation could be kept up continuously and would give the finest of strawberries and vegetables, and with the least expense for manure. One-tenth of an acre of strawberries is about what we want, or sixteen square rods. According to above plan our bed would each year be 1 rod by 16 long, or four rows sixteen rods long. One-tenth of an acre would be room enough for the smaller garden crops. The currants I would set six feet apart in the row and make all the rows, currants, raspberries and everything, eight feet apart. We have them so, and it is none too much for best results. If grapes are wanted, a row or two of them may be added, also gooseberries. Grapes are too liable to be frozen back in the spring on our farm, and after much fussing we have torn them all out. We can buy choice grapes from the shore of Lake Erie at a low price, better ones than can be grown here. All these plants may be set in the spring. You can get a full crop of strawberries the next season, and some raspberries. We got quite a few Shaffer raspberries the second year, only about fifteen months from setting out.

Now, the above is the neatest plan I can figure out, and as I should do if starting again after having had experience; but, this is the way we are doing: We have the currants, raspberries, etc., about in the proportion given standing by themselves, about fifty-six square rods. Then we plant each spring a new bed of strawberries, plowing up a little patch of one tenth of an acre in a field. Our fields come right up around the house and strawberries work in to our regular rotation. For example, we plowed a field for potatoes in the spring of 1891, and set out sixteen rods in one corner with strawberries. The field was put in wheat that fall, and clover seed sown this spring (1892). There was the strawberry patch out, of course, but as soon as they were all picked we turned the vines under and sowed clover seed, and to-day (August 17th) the land is green with clover. From a little distance you would hardly notice but what it was all sown at once. Our garden (what crops we think best to bother with) is right in our potato field each year. I speak of this because I would not like to have you come here and think I did not practice what I preached. If I could straighten my berries around into the shape I have advised you, I would gladly do so.

Now for the strawberries: I am not going into careful details for market growers, but just far enough to enable you to grow plenty for your own use and to do it cheaply. Manure the land to be set out in the fall, if it is not rich enough. It should be rich enough to bring at least thirty-five bushels of wheat or 200 of potatoes per acre. Plow in the spring as soon as it is dry enough to crumble nicely, as deep as it has been plowed before, but no deeper. Harrow and roll until it is as fine and firm as you can make it. Get plants from nearest reliable grower, allowing him to choose varieties for you if you are not posted. Tell him you are not, and the kind of soil you have. There are perfect and imperfect flowering varieties of strawberries. The former will bear if set alone, but are not as productive as the imperfect. The imperfect will not bear much if alone. They want some perfect plants near to fertilize them. I advise you to set alternate rows of each kind. When your plants come, put them in the cellar. Take about fifty at once and set them in a pail and fill with slightly warm water, and you are ready for setting out. A cloudy day is best, but any day will do, although towards night will be

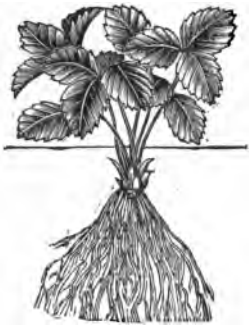


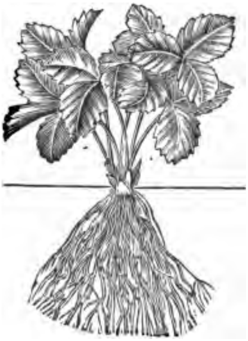
A Perfect Blossom.

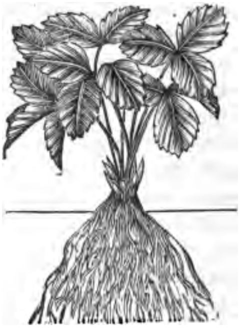


An .Imperfect Blossom.

better than in the morning. Draw a line through and make a scratch side of it so you can see where to set them, then remove line. Make rows four feet apart. Dig holes two feet apart in the row. If ground is mellow, a good garden trowel will do it nicely. My son sometimes goes ahead and digs out holes with a spade while I follow and set with a trowel. Hole should be four or five inches deep so roots can go down. Take a plant out of the pail of water, spreading the roots fan-shaped and hold against side of hole with left hand. With trowel put *moist* earth against roots, never dry earth. After partly filling hole press earth firmly against roots with trowel or hand, and then fill up rest of hole. If it is quite dry, pack soil very firmly, even to using the foot, and then scratch over the surface to form a mulch. The plant should be set just as deep as it grew before, and no deeper or shallower. The crown in the centre from which leaves come out should never be covered, nor should roots be left exposed. Do no watering. Depend on fine, firm ground, moist earth next roots and a stirring of surface. I never lose a plant. Get only good plants, new ones that grew the year before; no old ones even as a gift, and no little, weak, feeble things. The second year take plants from your own bed to set a new one. Take up with a potato fork, shake all earth off, trim off dead leaves and runners, and put plants in a pail of water. When you get a pailful then go and set them out. Let no one beguile you into setting a bed only in the early spring. An expert can set in the fall and get part of a crop. You will get discouraged if you try it.


Set Too Deep.


Set Just Right.


Set Too Shallow.

After they are set out cut off all blossom stems and runners, as they may appear. Do not let a berry grow. It will injure your prospects. Cultivate as I have advised for potatoes, often and after each shower, anyway. A one-horse cultivator with fine teeth is best. The Iron Age harrow and cultivator combined is perfect. The potato hook or pronged hoe is the best tool to stir the surface around the plants that the cultivator leaves (see picture in Chapter

XXII.). The secret of success is never to let a weed start or a crust form. It is a pleasure to care for them if weeds never get the start of you. It is fun to work clean soil. The hoe should never be needed, just the frequent stirring or raking of surface so no weed can grow. It is cheaper and pleasanter to do this three times than hoe once. The way I do is to go through the strawberries first after a shower, before beginning in the field. It takes but a short time and we *always* do it. Then there is no neglect, and we never miss the time. We never work deeply around the plants; just stir the surface, say an inch deep, and not right close to the plant, except with great care not to disturb the roots. We set out here about the first of May. Along about the first of July, when there comes a wet growing time, so they will start thriftily, we stop cutting runners and let them grow. Eight weeks of thorough tillage should get weed seed pretty well sprouted and used up. We have little trouble with weeds growing among the plants after this. We continue to cultivate and hook over ground for a time, and then as the runners occupy the ground use hook only to stir what is not covered.

Along about the middle of September, stretch lines through and cut out paths twenty inches wide, hoeing up all plants that are growing in paths. This leaves beds or rows twenty-eight inches wide. It is well to do a little spreading of runners or training during the season so they will cover all the ground. We go through once or twice and turn them some. And you need to prevent their running across from row to row or you will have varieties mixed. It is better not to have plants too thick in the rows. A plant, to do its best and produce the finest fruit, should stand at least six or eight inches from any other, all around. For very best results thin down to this by cutting out plants (weakest when you can) with a sharp trowel about October 1st. You will get as many berries, perhaps, without this trouble, but not as choice. Don't bother to try hills or narrow rows. I have tried all ways. This is best for a farmer. You can get the most bushels with least labor and with the most certainty. As soon as the growth stops and ground begins to freeze in earnest (about November 15th, usually, here) mulch the strawberries. If land is rich enough, put on clean wheat straw or marsh hay. I put straw all over paths, vines and all, just thick enough so I cannot see any leaves through it. Spread it evenly. If you think your soil not quite rich enough, or want to increase your chances for many and fine berries on rich ground, mulch with manure. Between the rows it may be rotten; over plants strawy manure would be better. There is little danger of getting it on thick enough to do any harm after ground is frozen. But spread it finely, not in bunches. In the spring rake a little of the straw off of rows into the paths on a wet day and tread down—just enough off so the plants can get up through, no more. The more straw around on surface under them the better, if they can get through it. It keeps berries clean and makes land moister in a dry time. Rake part of mulch off after freezing weather is over and before much growth is made under the straw. The mulch tends to retard spring growth,' to keep from starting as early. Where there is danger of frost, keep on as long as it will answer. For early berries uncover early. The danger if mulch is left too long is that plants will have made a white, feeble, tender growth under it that will be killed by sudden exposure. If you get caught that way, uncover when cloudy just before a rain. If manure was used for mulch, go over them and open with a fork and help plants to get through where they seem likely to be smothered, soon after growth starts. This is best done on a cloudy or rainy day. No further work need be done until picking time. The mulch should prevent much growth of weeds. If manure is used it should be free from seeds. A good farmer, you know, cuts his hay before any seeds ripen, and has no weeds in his hay or grain. There will be some growth of weeds, grass or wheat (from grain in straw), towards the last; but no matter, you can soon plow them under.

It only remains now to pick and eat them. The latter will be much the pleasanter job. Let them get fully ripe on the bushes, and then pick and put down cellar until cool. Then use granulated sugar and cream to your taste, and have them just as free as water for weeks, at every meal—great, large, delicious, fresh berries, such as not one city man in ten ever tasted of. Where picked for market, they must be gathered before they are fully ripe, and they never can compare with fruit fully ripened on your own vines.

I tried to keep a little track of what our strawberries cost us this season, as reported in *The Practical Farmer* of July 16. Here are the figures, counting hired man's time, team work, and all at cost, and I think I have them full high:

| | |
|---|---|
| Plowing (one-tenth of an acre), | $ .20 |
| Harrowing and rolling, | .20 |
| Setting five hundred plants, | 2.00 |
| Cultivating ten times, | 1.25 |
| Cutting off runners and blossoms, | .75 |
| Hoeing ten times (with hook), | 2.00 |
| Hoeing five times, | 1.50 |
| Cutting out paths in fall, | 1.50 |
| Mulching, | 1.50 |
| Use of land and manure, | 1.60 |
| Fixing mulch in the spring, | .30 |
| | $12.80 |

Last fall we did not thin out the plants. We got as many bushels of berries, perhaps, but they were not as fine. This fall we are thinning them. This would add a little to cost. In regard to the figures given above, we could not plow and harrow a little patch quite as cheaply as we have figured, but it was right in the field with potatoes, so we could do all together. A man in the business largely would get plants set out much cheaper than I have figured. Not being used to it, this is as cheap as we can do it well. It may seem to you that we could hardly hoe one-tenth of an acre for twenty cents. Where rightly cultivated, and no weeds allowed to start at all, a man can stir the little strip of soil that our fine-toothed cultivator leaves, with a pronged hoe, in one hour and twenty minutes, easily. The " hoeing five times " was done after they were too large to use a horse any more. It took a man with pronged hoe about two hours each time.

Now as a result we had all the berries we could possibly use and many to give away, and had to sell quite a few to get rid of them. In one day we made use of seventeen quarts, gave away twenty-six and sold thirty for $3. Fifty dollars would not buy the berries we eat ourselves, fresh and canned, etc., of the same quality. Some would call this extravagant, but I do not think it is, to devote one-tenth of an acre to giving us three weeks' delicious eating, and many for winter, and a chance to give bushels of berries to friends, with, perhaps, enough that we are obliged to sell to pay all cost.

Many farmers think and say that they cannot afford to fuss with strawberries, and that it is cheaper for them to buy them. If two or three men in each town would make a business of it and produce the berries for all, and people *would* buy them and use them as freely as though they grew them, this would be a business-like plan. But it is few berries that the majority of farmers would buy. I do not guess at this. They have told me so and their wives have, too. They must raise such luxuries in order to have them in the greatest abundance. And few farmers are situated so they can buy anything like as nice fresh strawberries as they can raise, even if they would. So I urge you all to grow strawberries at least. No matter if you have too much to do now, or if you are poor and just starting. This is one luxury that you can have. Systematically worked, the cost is small. Strawberries are the finest spring medicine in the world, and you need them, not in little doses, but all you care to eat at every meal for about sixty or seventy meals. But do not set them out unless you are determined to make a success of them; better save the money the plants cost and buy a few berries.

But I have given time enough to the strawberry. Now for a few words about the other small fruits in our garden and how we treat them. We set out currants, raspberries and blackberries in the spring about the same time we did strawberries, or a little earlier. The first year we cultivated and hoed them often, and just as we would a growing crop of potatoes, only for potatoes the hoeing can be done with harrow and weeder, and around berry bushes it must be done by hand. The land was clover sod, without manure, but rich enough to bring thirty-five bushels of wheat per acre in a good year. This very thorough tillage gave us a great growth the first season. The next spring we covered the whole surface of ground deeply, a foot or more, with straw, and for several years we have added straw every spring and done no cultivating whatever. The heavy mulching keeps weeds down mostly. Any that stray up through are cut off with hoe. Currants, raspberries, red and black, and blackberries are all treated in same way. It would not do for grapes, probably. We have found it the least trouble, and we get berries enough. Whether we have as many as could be got by cultivation, I am not certain ; but it is plenty and little work that we are after. Mice have not troubled us. New straw is always added in the spring. By winter the old is well decayed. We have several varieties of currants, but the old red Dutch is sweetest and best for eating. The Shaffer raspberry has done well for us. It is practically a red raspberry (purple) and does not sucker. Of the true reds, the Turner (early) and Cuthbert (late) have done best. The latter yield best. The Palmer, Hillborn and Gregg blackcaps do well for early, medium and late. All our blackberries do well and are quite good if left on bushes to get very ripe. The Taylor is, perhaps, rather the sweetest.

Our treatment of currants was to cut back the new growth about half, late in the fall, for first two or three years, and in after years cut out some of the oldest wood each fall, letting new canes take its place. So far we have picked the currant worms by hand just as they were hatching. They are found on the lower leaves and near centre of plant. With a little prompt attention one can prevent their getting all over the bushes. We pick off the leaf with eggs on it just hatching. We must have had some six bushels of fine currants this year. They have cost us almost nothing since first year.

We pinch off top of new blackberry canes when about two feet high. If there are more than four canes in a hill break them over. In the fall cut out and burn the old bearing wood. In the spring, just as leaves begin to start a little, cut back the rows of canes so as to make a nice hedge of them. Pinching makes them grow bushy, and then we cut off sides and tops of bushes a little. Blackcap raspberries are treated about the same. Red raspberries the same, only they are not pinched back. We pinch the Shaffer. We use a pair of grape shears to trim with. To make a tool to cut out the old wood, I took a large flat file to the shop and got them to draw out and curve around one end into a hook about two inches across. This was made thin on inside and tempered and ground. Then two holes were made in file so I could fasten it to a wooden handle four or five feet long with screws. With this I can cut out old canes and not get scratched. The suckers among the red raspberries and blackberries are kept cut down with a hoe the same as though they were so many weeds. We have kept the plants right in the original hills, not letting them grow into a thicket.

A view in our Fruit Garden, showing Straw Mulch and Blackberry Canes late in the Fall.

You have been told that currants, raspberries, etc., were all in rows eight feet apart. For high culture, don't put currants less than six feet apart in rows. I did. The man who sold me the plants told me to put them three feet apart. I shall have to take every other one out, to get finest fruit. My raspberries and blackberries are three feet apart in the rows, and about right. The rows being eight feet apart, they have a fair amount of feeding ground. In setting out, I would plow out furrows (in well-drained ground) and set all rather low, and only partly fill up furrows at first, say two inches or so; then as you cultivate and hoe during the season gradually fill up to level. If you set deep and fill all at once, the plants do not start as well. If you set shallow, they blow over in a storm worse, and I think currants do not send up new canes as well. I did not set quite right, and could see later where I was wrong. We use no stakes or wires or anything to hold up canes, but by pinching back make them grow self-supporting. If now and then one bends over under its weight of fruit, no harm is done, as it rests on the straw.

I have estimated that the work we do on our fruit garden in a year, outside of the strawberries, does not cost us over $5. Perhaps this is too low, but it doesn't cost much to put straw on, pinch canes, cut out old ones and prune in the spring. We have had as many as thirty-five bushels of raspberries and blackberries, but this was exceptional. We usually have just about enough. We want it so we can go out and pick from a peck to half a bushel of some kind of berries any day during the season for them. We could do that this year. Many can get wild raspberries and blackberries; but they are not, as a rule, as large and fine as cultivated ones. To be perfect they must hang on bushes until they are dead ripe, blackberries in particular. Wild ones here are usually picked by someone as soon as they are turned a little in color.

How long a patch will last without renewing, I do not know. Ours show no signs of running out. If well cared for, I have an idea they will do well for a long time. With us raspberries come before the strawberries are gone, and blackberries follow the raspberries as closely, so we can have small fruits every day from our garden for nearly three months. We kept count one year, and we had berries or currants every meal for eleven weeks. But this was done partly by letting some blackberries hang on the bushes where they were shaded by leaves, just as long as they would. We have gone without fruit in such abundance; did for many years. Thought we could not afford it. We did not know how cheaply it could be grown, if one went at it rightly. If living our life over, the fruit garden would be started when we bought the farm. We were mistaken and lost much that we might have had to enjoy. I hope we may induce some young people to start right. But not until they have thoroughly decided to make a success of it.

Now, I am afraid if I do not guard what I have said a little, that it may lead someone astray. Here I have told of one-tenth of an acre of strawberries, for example, costing but $12.80, besides the picking, and hinted at getting some $70 worth of berries from it. Some friend might figure this up and find that there was a very large profit per acre in berry growing. So there is, if they are large and fine, better than the ordinary, and sold fresh to people who are willing to pay for something really nice. And I have found there were plenty of that kind of people. But it doesn't follow, my friend, that there is money in it for you, if you are a farmer. You would probably lose if you tried to grow berries to sell in connection with your farming. They need all your time and attention to pick and market, just when clover hay wants cutting, and potatoes and corn need constant tillage, and they cannot be neglected at any time during the season, if you want a big, paying crop. Do not think such results as I have pictured, or obtained, come without thorough attention. I had rather lead you to be more thorough in what you are now doing than to take any more business on your hands, which would have a tendency to make you less thorough, only just to the extent of having berries enough for family use. In some cases, where there are children who could attend to the picking and marketing, with a little oversight from the father, a quarter of an acre or so might be grown and managed without trouble, but I would not do it unless the children were given the money, so as to teach them the value of it and how it comes. This from experience. Our children once sold $83 worth from one-fourth of an acre and had it all for themselves; but they also furnished us some thirteen bushels for eating and canning. We have grown a half acre a year, too. The product one year nearly reached $300. There was money in them, although we live in such a frosty locality that it would be risky to go into berry growing largely. But we found we had better not divide our energies. Even with the few crops we raise, we cannot afford to grow berries to sell. There is money in almost anything that suits your soil and locality, if properly followed; but there will not be money in anything, if you undertake to do everything. That is what I want to guard you against.

# CHAPTER XXXVIII.

## THE WIFE'S SHARE.

THERE are many things that are not quite right in this world, and I suppose always will be, but still we are improving. Many great wrongs have been righted wholly or partially. Wives are treated much nearer right than they were fifty years ago, but there is some chance for improvement yet in many cases. Now, perhaps, you may be surprised at such a statement; you may say that you do not know of any wives that are ill-treated, or, at least, only in some very rare instances. Well, I do not mean that they are actually abused, or anything of that kind, but that they are treated as though they were inferior beings; they are "ruled over;" there is too much of the lord and master spirit in the husband. This may not be intentional, but it hurts, all the same. I believe that, usually, men have grown up with the idea that man was the head, and have not ever stopped to think what was simple justice in the matter. It will certainly do us no harm to talk over these things a little, and a book giving the substance of my writing, and preaching, and practice, for many years, would not be complete without something on this subject. I believe that the time has come when husband and wife should be full partners, equal partners, in every respect. A young farmer could not do better than to start out, when he was married, on a platform something like this: We will suppose him speaking to his wife. "I will plow, sow, reap, and do the bulk of the business, while you tend to matters in the house. You make me a pleasant home, thus making me stronger to battle with the world. We are full partners, and I will always consult with you about my part of the business, and shall expect you to do the same with me; that is, about any important particulars. Whatever we may make shall be yours just as much as mine. Neither of us shall ask the other for small sums of money that we may want to do as we please with, but simply help ourselves out of the general fund. Any large outlays we will, of course, consult together about, as partners should, but we will have confidence enough in each other's judgment not to ask nay questions about small amounts. The pocketbook shall always be open to you, at any time, the same as to me. If you take out $5, why simply enter on the cash book, 'Wife, $5.' I would pay you a stated amount each month to do as you please with, but that is the way we do to our servants, whereas you are my *partner*, and I consider your labor just as important, and just as laborious, as mine."

Here you have my platform, and I believe it to be right and just, and one that our young farmers could live happily and perfectly on. I presume some readers would bring up passages from the Bible to prove that the man was the superior being, but I think these can be explained. The Bible favors justice every time, and the above platform is just. Let us take time to look at what Paul says on this point: "Wives, submit yourselves unto your own husbands as unto the Lord. For the husband is the head of the wife, even as Christ is the head of the Church." This seems to settle the matter, doesn't it? But let us see. We can hardly be governed by a single passage of Scripture, taken alone. Paul also says on this point, "Husbands, love your wives, even as Christ loved the Church and gave himself for it." Do you fully realize the strength of that statement? What man could love his wife like that, and not make her a full partner, with all a partner's privileges, rather than a dependent that he should play the lord and master over? When we consider how woman was treated and looked upon at the time Paul wrote those words, I think we must acknowledge that they show more than human wisdom. She was very nearly a slave, if not quite. For Paul to have preached equal rights for men and women then, as I do now, would have been the heighth of folly. But notice the course pursued. The first quotation from Paul, every one would say, was all right. Yes, woman must submit; man is the head—that is sound. Then the second quotation no one could object to. You see, without antagonizing the public sentiment of the day, Paul gave advice which, if wholly lived up to, would give woman about all she could ask for. But I cannot help but think that if Paul were living now, with public sentiment so nearly up to the equality point, he would drop out all that part about the husband being the head.

But let us look over the above platform a little. Is not the work of the wife, the farmer's wife in particular, as hard for her as her husband's is for him, and as important for the world's welfare? Her work does not bring the dollars as directly, but is it any the less important? As a rule, how much would a man amount to who attempted to do his work out doors and tend to his own home? By the division of the labor between man and wife, the best results come to each. We may have a home that is a home. If the wife works as hard and faithfully as her husband, as most farmers' wives do, at work that is necessary for the advancement and comfort of the firm, then there is no good reason why she should not be an equal partner and sharer of the proceeds of their joint labor. Let me illustrate: I came in one night, and my wife said to me, "How much do you suppose your work to-day will bring you?" I did not suspect what she was driving at, and replied, "Why, probably, my work to-day, with the horses, will bring me $5." "And I have worked all day to do the washing and ironing, which you could have hired done for $1," she replied. "You have made $5, and I $1." "No, that is not right," I said. "We have together earned $6. We have both been doing work for the firm that must be done. Yours has been the hardest. It is not right to put the figures on it as you have. You might have driven the horses and rode, as I did, and I should have had to work hard all day to do your work, and, probably, not got through then. And you forget the three nice meals you have got for me with the children's help, and the nice, pleasant home, all kept in perfect order, which is such a delight to a tired man when his day's work is over." Now, who was right, wife or I? She is usually, perhaps, but I was then, and she knows it.

I think you can see from the above platform, that I do not believe in a farmer "giving" or "paying" his wife so much a month to do as she pleases with, or as her share. We give to beggars and pay servants, and I cannot look on the wife as being either one or the other. If she is your partner and not your slave, there is just one right way, treat her as your equal in every respect, —treat her just as you would a man who was your partner. Let there be one general fund, which both have helped with equal faithfulness to raise, and which either party draws on with equal freedom, in a small way, or in a large way, after due consultation together. Do you say the wife would be too extravagant if given such freedom? Have you any more right to think this of her than she of you? Ah! that "lord and master" and "head" spirit dies hard. As a rule, women are not as extravagant as men, —I mean farmers' wives. There are exceptions, of course. If you will think this matter over honestly and fairly, you will agree with me. We do not see our own extravagances. It is possible that a wife, who for many years had a little money "given" her as she asked for it, might be a little too free with the pocketbook if let in all of a sudden, but in ninety-nine cases out of a hundred, it will be entirely safe for a young farmer to begin in this way, letting his wife know just what they are making, and talking over with her just what they can afford to spend. There is no better check to extravagance than positive knowledge of one's real income. A wife may hear her husband always preaching that he is hard up, but sees him getting tools, new harness, or whatever he wants, and she very naturally gets an idea that he is not as hard up as he would have her think. I hope every farmer who reads this will hereafter take pains to talk over his business matters with his wife, if he has not been in the habit of so doing. Let her see just what they are making. Treat her as a trusted partner. Consult with her about the more important matters. Then you need not fear any extravagance, if she has free and equal access to the general funds.

Some farmers' wives have the money from the chickens or the butter for theirs. Well, this is good, but it is not equal partnership. If the wife wants to help along by keeping chickens or making butter, well and good, but let the money go into the general fund. It is well for the children to earn money separately from their parents, but that is another matter. It teaches them business and the value of money. But do you want your wife, your trusted partner, earning money in some little side-show, separate and apart from you? Well, I don't want mine. And still this is far better than for the poor wife to have to ask for every dollar or cent she gets. Have you any idea, my masculine friends, how she must hate to do this, if she is a spirited woman? Change it over. Would you like to have to ask your wife for every cent you got, even if she always gave it to you graciously? Oh! we never can know how many hearts have been made sad in just this way. And it is simply habit and thoughtlessness, nearly always. Men do not mean to be unkind to their wives. But any woman of spirit must feel more or less bitter every time she has to ask for some of the money she has earned as much as the man who holds it and doles it out to her as he sees fit. There are, of course, families where love reigns and noble Christian sentiments; where the wife is loved as Paul says she should be; where it would not be much of a hardship for her to ask for money; and still, if you could read her heart you might find that even she would like it otherwise. But how many wives there are who are less favorably situated! Said a good old lady to the writer once, after he had been talking for an hour on this subject at an institute, and as he was leaving the hall at the close of the meeting: "Mr. Terry, I do not know as my husband ever positively refused me a dollar in the world when I asked him for it, but as old as I am, if there was any way under Heaven that I could earn the money, unbeknown to him, I would do it before I would ask him for it." This with the tears streaming down her aged face. She must have been some seventy years old, and her husband is a very wealthy farmer, who must soon drop into the grave, where he cannot take either his money or his lord and master spirit, thank God. How terrible this case seems! and the worst of it is that it is not an isolated one, by any means, although most women would bear their burden in silence.

But another point is suggested. What rights has this woman after her husband dies, if he should pass away first? Will she have her "innings" then? Well, let us suppose a case: A man and his wife work and save for twenty years or more to pay for a farm and get it fixed up as a home for their old age. At the end of this time the husband dies without any will. There are children. Now, according to our Ohio law she cannot control absolutely one acre of that land that she has spent the best of her life in helping to pay for. She can have the life use of one-third of it.

If that will keep her, well and good; if not, she may go to the poorhouse Is this just? Far from it. If there are no children all property goes to the wife, in Ohio, which is right. But if there are children, the wife should own absolutely one-half of that farm she helped to pay for, and half of all other property that they together accumulated, and then a life interest in the rest, if she wishes it. For my part, I would say give the wife all the property of the firm absolutely, in the case of the death of her husband first, just as the husband has all if the wife dies first. Can you name any good reason why this should not be so? Perhaps, you say, the wife might get married again, and if she owned all the property, her first husband's children might never get any of it. She might leave it to her second husband. True, but if the wife dies first all the property of the firm is the husband's to do just what he pleases with. He may get married again and his first wife's children may not get a cent. He is not held to his duty by law. Why should his wife be? It is the old spirit. But we may trust the mothers of this land as far as the fathers. Little by little wives are getting their rights. There has been a decided change since I can remember, as I could show you if there was time. Before a great while the good time will come when the wife will be considered just as good and trusty as her husband, and an equal partner in money matters. There are many homes to-day where this is literally true. When public sentiment shall have arrived at this point, then our laws will follow it up. Until this good time, let every farmer who reads these pages, look out for his wife in the particular just named. Make a will, or in some way arrange it so that if you should be taken away first, your wife will have what justly belongs to her, and what every good husband wants her to have. Fix it so that she shall be just as free to manage after you are gone as you would be if she should die first. Now, don't delay, but do this to-day, at once. It is right, and noble. If you accept of my platform, my young friends, as given above, you should at once make arrangements so it would be carried out in case of your death, "Whatever we may make shall be yours just as much as mine." A good way would be when you buy a farm, to have it deeded to yourself and wife jointly. Then I should make a will leaving my wife my share and she would gladly return the compliment. Rest assured, my wife will not have to leave our farm if I die first, and she can sell it, and use the proceeds, if she desires or thinks best.

It is generally given as a reason why the wives should not have equal chances with the husbands that women are not equal to men in ability. When kept constantly at given drudging housework we could hardly expect them to be. When given an equal chance with men, can any one doubt that they would soon be able to hold their own? Have they not shown their ability in almost every line? But still we do not want women to have that ability that comes from long contact with the business of the world. It would in time (allowing a man to judge) spoil them for that greater, nobler work that Nature has particularly given to them, that they should be the home-makers. Nature has made woman the superior of man in loveliness, and tenderness, and gentleness, and patience, the very qualities best fitting her for making heavenly homes here on earth for us men. Let us fully appreciate the gift and then we can consider it no more than simple justice to make our wives our full equal partners.

I would like to speak of one other point in this connection: The work of the farmer's wife is usually exceedingly monotonous. It may not require as much physical exertion, but the everlasting treadmill grind is what makes it so hard. It isn't washing dishes and sweeping and cooking for a week or a month, but year in and year out for all time. It isn't getting meals for a day, but for 365 days in a year. Notice the 365—no Sundays for the poor wife. Just about the same work that day as any other. It is the constantly occurring little worries, too, necessarily connected with her share of the life's work. All these tend to make her life not an over-easy one. We may safely say that a great many farmers' wives have been driven to insanity by the monotonous character of their work and the working seven days in a week. It is a serious point that we should all think over. Now notice the difference with the farmer himself. There are constant changes in his work. He plows and sows and cultivates and mows, runs the binder and threshes, and works in different fields. Also his work takes him to town, the blacksmith shop, the mill, the store. He sees new faces and new scenery, and has new matters brought to his mind, which is a rest or recreation. All this, more or less, in the regular line of his business. Is it so with his wife? Does she not work right on in the same kitchen with scarcely any variation in her monotonous duties? And does the farmer do his regular work on the Sabbath day? He has his chores to do, but entire freedom from regular work, unless he keeps a large dairy. His wife gets meals Sunday the same as any other day, washes dishes, sweeps and cooks. No change for her, or rest to speak of. If they go to church, as I hope all my readers do, how much rest does the poor mother get? Well, it is good for her to go, but more than one tired mother has told me that Sunday was the hardest day of the whole week to her, with the children to get ready and her housework, too.

But now what can we do about all this? Well, my friends, the wife can be helped very much by a little care on the husband's part. Take her away from her monotonous work often. When you have to go to mill or town on any errand, systematically plan to take your wife with you whenever you can, even if not always entirely convenient. Encourage her to visit friends. Go to grange meetings, picnics, etc. Broaden her life a little. Take the simplest of meals part of the time, rather than have an overworked wife. Consult with her about business matters, so as to get her mind off of her little petty worries. In short, just make her a full partner, that is all. Perhaps your wife got in the habit of staying close at home when the children were little. See that she gets over it as soon as possible. It may become almost a second nature, but it will injure her all the same. You may have been thoughtless, my masculine readers, in regard to this point, and rather discouraged the good wife from going out much. You intended nothing wrong. It is so nice to have "mother" always at home. But it would be dreadful to take her to an asylum, or lay her under the sod, when she ought to be right in the prime of life. Wives in town are not as closely confined. They get out a great deal more, and there is more that is new to see and talk about. As loving husbands, we must try and make up to our wives, so far as possible, what is needed to make their lives fuller, longer and happier.

# CHAPTER XXXIX.

## INSURANCE.

THE substance of this chapter has been talked at our Ohio institutes by the writer and published in our annual report. But I have taken much pains to inform myself more fully on some points before writing this. We have heard enough about insurance from the one side—the company's—but this paper will treat the matter entirely from a farmer's standpoint. The basis of it, of course, is our experience in insurance—what we are doing and think best.

I have heard farmers say that they would keep their money and insure their own buildings—run their own risk. Let us consider whether or not this is a sound business policy. A farmer has a house, we will say, worth $1,000. A payment of $2 a year will insure him against all loss by fire and lightning. At least, this is rather more than we pay per year per thousand dollars, but we have to get insurance for five years at a time to get so low a rate. Suppose him to be thirty years old now. He can hardly expect to live more than forty years longer. During that time he will pay out but $80, not counting the interest on the payments. Should the house burn during the last year of his life, or forty years from now, he would have saved in premiums $80, and in premiums and interest at 6 per cent. somewhere near $300. That is, the premiums saved and put at interest would amount in the forty years to about $300. Had this farmer put his first $10 in a bank at 6 per cent. interest for five years, and then, at the end of five years, put another $10 with it and loaned it for five years, accumulated interest and all, and kept doing this for forty years, if I figure correctly, he would have but $315 due him. Thus, if the farmer's house should burn forty years from now and had been kept up in repair so as to be still worth $1,000, his loss would then be about $700. Add to this the always possible contingency that it may burn to-night, and it is hard to see how the individual farmer can make any money out of insuring his own property. But, you ask, how can the insurance company afford to do it if I cannot? Because they know about what the chances are for fire, and by taking a large number of risks, they can take a little from each farmer and be able to pay all losses, and do a safe business. But they cannot do this unless they do take a large number of risks; the larger the safer. Small mutual companies are liable to be broken up by a heavy loss, where they have but few members. Too large a payment is brought on to individuals at once. I am carrying $8,400 fire insurance on house, barn and contents. Suppose twenty of us neighbors unite in a mutual company and my buildings burn—a total loss. Don't you see it would be pretty hard on the nineteen to shell out $8,400 to me all at once? It would break up the company. Of course, this large loss might never occur, but then again it might to-night. The risk is always present, and is too heavy. With a great, large mutual company, and many thousands of members, the average of losses would be light and the company safe. For a single man to take this risk is far worse than for a small mutual company. He stakes all his buildings are worth on a single risk, which is a desperate business. If the farmer who takes his own risk has means to rebuild with, that he can lose without hardly missing it, why he may do his own insuring, but it is a desperate risk, all the same, and it would be far better business policy to get his property insured in a large, sound company. If a man owned a thousand houses, standing apart from each other, he might to advantage run his own risk. The saving in premiums would be a large enough matter for him to take the chances, the same as a regular company does. He could probably more than pay his losses as they occurred.

The farmer who has not the money to rebuild with, certainly should not run his own risk on a single one or two or three buildings. A loss to him would mean serious trouble. Let the well-to-do man take the risk, if he chooses, but the one who is in debt or barely owns his farm, can afford to run no chances. Our great insurance companies have been getting very rich, I will admit, but this makes the insurance money so much more certain to come, in case of loss. I was talking to-day with the agent of a large company who told me they were drawing on their surplus this year, as fires had increased so of late. A heavy surplus makes us so much safer. Really the premiums charged on farm property are not unreasonable. The writer has kept all his buildings and their contents quite fully insured, ever since he had any. To be sure, twenty-two years have passed without a loss. Had I done my own insuring, I might have quite a little more money at interest to-day, that is now in the hands of the insurance companies, or has been paid to my more unfortunate brothers. But here is the point: How do I know my house will not burn to-night? The well-insured man, though dreading fire, can certainly feel easier. He has done what he could to meet an emergency that may come at any moment. He may go to sleep and trust in Providence. I said I had kept all buildings and their contents quite fully insured. It is the rule, I know, to not take buildings at more than two-thirds of their actual value. This is simply, of course, to avoid the risk of the owner burning his own property, or letting it burn in case it catches fire. Otherwise, companies would not care how high they insured your property. Any farmer who is out of debt (the danger of his burning his own property thus being less), and has a good reputation, and buildings in good, safe shape, can get them insured for about their full value. My house, which cost $2,500, was insured the first five years for $2,000. At the end of that time, I asked them to take it at $2,200, as I would like to run as little risk as possible. They took it. When my barn was first insured, it had cost me about $1,800. I asked for a policy of $1,700, telling them just what barn cost, and got it. I have just renewed the insurance for five years for $2,000, some more having been added to the barn since. The agent told me he was entirely willing to take it at that. He knew from the circumstances that it was safe to do so. Not only would we dread to have it burn, if getting every dollar of cost back, but we use the greatest precautions to avoid accidents. We have railroad lanterns only, using lard oil, and these even are never taken into the main barn where hay and straw are. The lanterns are hung in the covered barnyard, right near the water tub, where they shine through window into stable. I employ no man that smokes, and of course do not do it myself.

My hay, grain, fodder, potatoes, etc., are insured together for $1,000. This would be more than sufficient to cover hay and wheat, which are first put in barn. We always sell wheat before digging potatoes. After that is gone there would be, perhaps, $700 to $800 to go on potatoes. As we store them all in the barn after digging, usually, for a time, a fire just then would be apt to catch us some on them. But they soon begin to go, and we take a slight risk for a short time. Should there seem too much risk we can put part of potatoes in house cellar, which is arranged to hold them handily. They are insured there in a blanket policy that covers "furniture, provisions, potatoes, etc.," to the amount of $1,450. Live stock are insured against fire and lightning on the farm to the amount of $500. We keep only our horses and a cow, and the company will not pay more than $100 for any horse burned. Our tools, carriages, harness, etc., are insured for $1,200. They could not be replaced for this, by any means, but it is about all I could get allowed for them, probably. On buildings our Ohio law now obliges companies to pay what they insure them for, in case of loss. If they take a premium on $1,000, they must pay $1,000 in case of total loss, or rebuild the house or barn. In Ohio, then, we can safely insure our buildings as high as we can get good companies to take them. In other States, where they have no such law, it may not be wise. They might not be willing to value them as highly after a fire as you did before one. Before our law was passed, many a farmer paid on an amount that he never would have got in case of a loss. In many cases this worked an injustice, which brought out the law. It is a good one and right. Companies must be careful what risks they take, and an honest man who pays on $1,000, should get $1,000, if a fire occurs. The company must see that they do not let rascals get the start of them. On contents of buildings, however, companies are not bound to pay only what they are worth in cash at time of fire, no matter how much insurance you may be carrying. On this point I have lately asked some of our great companies to tell me just the facts. One question was, "In case of loss, will you pay me for my tools, wagons, etc., what they would bring at auction, considering that the cash price?" "No," they said, "that would be wrong. We intend to pay what they are actually worth to you in cash. Not what you paid for them, but what you paid or what they would cost now, less a reasonable sum for what you have used them. You do not want to sell, and it would be wrong to make you take a forced sale price. You should have just what they are worth to you to go right on with." That is fair and square, isn't it? And the same holds good with furniture, of course. You should not, then, insure such articles at cost, but at a fair cash value, allowing for depreciation from use. If you insure for too much you are losing. The agent will not often tell you this. He will usually take as high an insurance on such articles as you choose to carry, but it is not to your interest to get it too high. The companies tell me they will pay for hay, grain, etc., at the market price at time of fire, for ordinary use. For example, I had some potatoes in my cellar last winter, raised under contract, for which I was to receive $1 a bushel in the spring. The insurance men said they would only pay me, in case of fire, the market price of eating potatoes—say thirty or forty cents. This is what they say of potatoes and grain, valuable for seed, etc. But it is a question whether, if I could prove that those potatoes were contracted to a reliable party at a $1 a bushel, they would not have to pay that. We may carry insurance on farm products safely at market price, on tools, furniture, etc., at a fair reduction for wear, from cash price of new ones, and on buildings (in Ohio) at well up to what it would cost to replace them.

As stated, we carry now $8,400 fire insurance on buildings and contents. The cost in a large, safe company at present is $76.40 for five years, or $15.28 per year. This is not a great deal to pay for security from fire and lightning. I would not dare run my own risk for ten times that amount. I am not an insurance agent, friends, and never was, but just a common farmer, trying to do business in a safe way. It is a terrible thing to be burned out, but it helps greatly if one is well insured in a good company.

One large company names the contents of house in its printed blanks, as "household furniture, clothing and provisions." I find many farmers are in doubt as to just what this covers. This question has been brought up when discussing this matter at our institutes. I did not feel entirely certain, and so inquired of the company what they were in the habit of paying for as household furniture. They said, "Anything commonly used in the furnishing of a house, except musical instruments, silverware, books, etc., as noted in policy." I asked if it included, then, carpets, beds and bedding, stoves, crockery, sewing machines, clocks, and a writing desk. They said, "Yes; excepting, perhaps, your large desk, costing $55, might be rather classed as office furniture than household." So, to be sure and cover everything, I have my policy on house contents read, "household furniture, clothing, provisions, musical instruments, books, pictures, fuel, writing desk and potatoes." I buy my provisions in quantity. Have nearly two barrels sugar and several barrels flour, etc., now. I inquired whether such an unusual quantity would be all right in case of loss. They said certainly. Potatoes would be classed as provisions, but, as we sometimes store so many, it seemed best to have them specially mentioned.

Here I might speak of the matter of lightning rods. We have none on house or barn. As commonly put up, they are of no use, and often are positively worse than nothing, serving to some extent to draw the lightning, and not being fixed so as to care for it so it shall not injure the house. A rod can be put up so as to protect the building if it received the flash; but I doubt whether there are three in this town that are so put up. A common five-eighth or three-fourth continuous iron rod, with a bright sharp point and a large sheet of metal soldered to the lower end—copper, I think, is best—and the lower end in a well under water, or down in soil that is always wet, might do some good. All fancy rods, glass insulators, etc., are mere moonshine. If I wanted a rod, I would put it up myself, with the aid of our home blacksmith and tinsmith, at a small fraction of price charged for rods that are of little or no value. Such a rod would take care of lightning that hit it; but that it would always protect the house, I cannot say. A great insurance company of long experience does not make any difference in charges for insurance against fire and lightning, whether the building has rods on it or not. In fact, they told me they would prefer there were none on it, as they were almost invariably put up. In case of a bad thunderstorm, sit down quietly in the centre of a large room, with doors and windows shut, and trust in Providence. Avoid corners of building, or nearness to stoves with fire in, or a position between stoves, or stove and any metal, such as sewing machine or piano.

If your policy is burned up with the house, can you get your insurance? Yes, I think so. Companies always keep a record of policies, and could be made to produce their books, if not so disposed. But I should not expect trouble with any large, reliable company, and I certainly would not deal with any other. One company told me they always took the application along to settle by when a fire occurred, and it made no difference whether owner had policy or not, if he had paid his premium all right. But I had rather have mine. It is businesslike to have the evidences of indebtedness in your possession. This is the way I manage: The house and contents and barn and contents are insured in different policies, and the policy on house is kept in the barn, and that on barn is kept in house. In case of sudden fire, we will lose the policy on the building that is not burned, if either. By dividing the insurance, also, we do not have so much to pay at one time. Seventy-six dollars would be quite a little sum for a small farmer to pay in one year for insurance, and it might come in a bad year, too. Half of it this year, and half two or three years from now would usually be easier paid.

During late years one has seemed to be a good deal in danger from windstorms, as well as from fire and lightning. So there has sprung up quite a demand for cyclone insurance. When we got our new buildings done, we felt that it had taken so many years to earn them that we must take every possible precaution to secure ourselves against their loss, and so took out a cyclone, or windstorm, policy on the house for $2,000, and on the barn buildings for $1,500. We thought best to run our own risk on contents, and did not insure buildings as high as against fire, as the risk of total loss is exceedingly small in this location. The cost is $1.60 a year on $1,000 only. A very small sum; but whether it is advisable for us farmers to invest in windstorm insurance as certainly as we do in fire insurance, I do not know. Location and height of buildings have something to do with this. The risk is probably not one-tenth of that from fire. Should many go into it, or should we quite generally, the risks might be taken at a very much lower rate than now. The present rate is too high. There is no moral risk, you know. A man cannot blow his own house down. If a neighbor should neglect to insure against wind, at present rates, and a hurricane should take his buildings away, I should feel like turning in and helping him rebuild, if he needed help. But if he should not insure against fire, saying he would run his own risk, as some have said to me, and his house should burn, I should not feel it my duty to help him rebuild. A man who takes risks of this kind on his own shoulders should suffer the consequences if they come, but I should feel very sorry for him; and when I come to remember his family, and how we all make mistakes, I think I should have to help him a little, too, although I pay for my security, and he chose to take his own risk. There are so many ways that money *must* go, and it often comes in so slowly. I know all about this. But, truly, the harder up one is, the more real need of insurance.

I hardly knew whether to renew my windstorm insurance after it had run its first five years or not. But I finally did; $5.60 a year for $3,500 insurance is not much. I can rest that much easier when it is black in the West. But really it is too much.

Some good fire insurance company should add this to their policy against fire and lightning, charging a trifle more. For example, I pay my company $76.40 for $8,400 fire and lightning insurance, and pay the same company $28 for $3,500 cyclone insurance. They could well afford to put them together into one policy for $84, and issue no separate policies. Lightning was added into fire insurance policies in this way, and sooner or later some enterprising company will add loss from wind. If every reader of this book should send a postal card to their company asking for this, I predict we would get it.

Next we come to life insurance. Should farmers keep their lives insured? Sometimes, yes; and sometimes, no. Suppose a man with a wife and, perhaps, a baby or two, runs in debt largely for a farm. Suppose again that he should be taken away suddenly while this debt hangs over him. Now, under these circumstances, there is no question but what this farmer should get his life insured for the benefit of his almost helpless wife and babies. It is a duty that he owes them, now that life insurance is so safe and so reasonable in its cost. His good wife is so encumbered that she cannot take care of herself as she could before she was married. I can hardly see how a man can love his family and not take this precaution for their welfare in case of his death. Now, remember, this is where the business of the farmer is in such shape that there would be little or nothing left for the family in case an administrator had to settle his estate. When the writer was in this condition financially (babies and all) he kept an insurance on his life, in favor of his wife first and children second, for $3,000. This was kept up until the farm was paid for and some improvements made. Then the policy was reduced about half, and so carried for a time, so that in case of my death my wife could have a little ready money, enough to keep her along a year or two, until she could sell the farm to advantage or make arrangements to continue on it. This might help her to get married again? Yes, and all right if she thought best; but I did not want her simply forced to get married for a home. Any larger insurance than this did not seem to me wise, where one was in debt, or needing all the money made for improving his farm, or taking better care of his family. There is a proper balance in all such things. For a poor man to carry a large policy of, say, $10,000, and scrimp his family from day to day, to save money to pay his premiums, I would consider a misuse of life insurance. To practice even close economy so as to provide reasonably against possible misfortune in the future, is wise and prudent. In other words, I would not make a speculation of life insurance. I would make proper use of it as of other good things. The great life insurance companies are pretty big institutions, but they know the power of the pen. One of them learning of the ground I took at our institutes, and wrote about in papers, sent one of their finest talkers here, a man who said he had talked not a few of the great men of the country into putting vast sums of money into life insurance as an investment. He came and talked and talked, made black white, and everything else. Very strong inducements were held out to me to take out a large policy. Not that they cared for my little money, but for my influence. I pitied the man. He had been sent a long distance for a special purpose, and he did work hard, but he failed.

In life as in fire insurance, the large stock companies are the safest. An unusual death rate in a small mutual company makes trouble, as many will drop out. In a very large company, the death-rate can be calculated on almost to a certainty. These great companies are growing very wealthy, but this makes them all the safer. The little they get out of one individual over actual cost of insurance is not much. Their money is mostly made by doing a very large business. Should their rates become excessive, competition will bring them down.

But now we will suppose our young farmer has got his farm all paid for and well improved, with good buildings and plenty of tools and fine stock, and, perhaps, a little money ahead—is what we call well fixed, like lots of you. Shall he still keep up his life insurance? Here is where the insurance companies do not like my preaching or practice. I say it is not so important whether he does or not. The really important time to reap the benefit of life insurance has passed with him. He may keep it up as an investment for the good of his family or heirs, if he chooses. For my own part, I believe I can do better. When I got insurance it was the cheapest form, simply temporary security, nothing more; no participation in profits or anything of that kind. It cost me about $10 a $1,000 a year. This I could drop any time, and end the matter. I was not after an investment. This is the way I do now: Instead of paying my money for life insurance, I take a few hundred dollars each year (and have for some time), what I can spare readily from the gain to my working capital during the year past, and without scrimping my family, and deposit in one of the safest savings banks in the country. The book is made to Theodore B. Terry and Eleanor M. Terry, his wife, and bears this indorsement across its face: "Either can draw a part or the whole. In the case of the death of either party the balance belongs to the survivor." Now, in the case of my sudden death, my wife can instantly draw any money needed. She doesn't have to wait sixty or ninety days on an insurance company. And in case we need the money before the death of either party, we can get it instantly, all of it or part, with a small, but sure, interest. There is no speculation about this; it is straight business. Should I die soon, my estate would be better off if the money had been put in life insurance; but I am not anxious to have it thus. I am not living, I hope, to see how much I can leave when I die. In case of my death soon, my wife and children (all full grown) could get along well and live about as we do now. Truly, I would not care to have them make $10,000 or $20,000 by my death. The best way to go through this world is to enjoy yourself all you can, and help others to do the same, each day, as you go along. Provide reasonably for the future, but just as reasonably for the comfort of wife and children from day to day, as far as possible. I pity the man who scrimps his family and himself through life, to pile up an estate for heirs to quarrel over, and likely be a curse to them, when a part of it could have done so much to make life more truly enjoyable to his loved ones while he was with them.

I have heard good men quote a passage from Christ's sermon on the mount, as if it prohibited life insurance: "Take no thought for the morrow." Does any one think Christ meant that to be taken literally as translated in our Bible? If so, who inspired Paul when he said: "If any provide not for his own, he is worse than an infidel." Christ certainly meant no more than that we should not be overanxious about the future—should not worry. If there is anything that will make a man easy about the future, it is reasonable provision for his loved ones. Once, when the writer lay just at death's door, threatened for days with lockjaw (our good physician has since told me it was a wonder his hair did not turn white under the terrible strain, and I knew the danger just as well as he, and the fearful doses he was giving me as a last resort) the life insurance policy was worth more to him every hour than he had ever paid. It was nearly all that stood between his dear ones and want. Would that you could know how it helped me, although suffering to the very limit of human endurance. Life insurance is one of the greatest and grandest institutions of our civilization. It has helped wipe away the tears from thousands of helpless eyes, and cheered many a strong man on his dying bed. It has smoothed an untold number of pathways that otherwise would have been terrible to tread; but, my friends, let us make it our servant, and not our master.

I might speak of insuring the lives of our farm animals; but I do not take any stock in that kind of insurance. The risk is so little, and the loss when it comes is so small that, as a rule, we hardly need to provide against it. Good shelter and feed and pure water and watchful care and kind treatment will insure the lives of our animals sufficiently.

An accident insurance policy might be wise under certain circumstances for a farmer, where the income must stop where his arm failed and means were very limited. Still, I think it is very seldom it would pay. Serious accidents do not often occur, and light ones will hardly stop our energetic farmers. I think neighbors may be relied on in such a case to help one out, if he needs it. The writer was unable to do his regular work for a whole season as the result of an accident—the time spoken of above when he came so near dying—but he hired an extra man, and used his head to direct and figure, and came through all right. In fact, he learned more fully than he knew before the importance of plenty of headwork. It was a hard way to learn a lesson, but it was a valuable one that I had forced onto me that summer. All accidents will not turn out as happily; but, I believe, as a rule, we farmers need not insure against them. If I were a brakeman on a freight train—with a young wife and children, particularly—I would take out a large accident policy. It is wonderful how far this matter of insurance is being carried now. Why, it looks as though we might soon be able to insure ourselves against having our wives run off with a handsomer man. Marine insurance is more than three centuries old, and life insurance has been known for nearly two hundred years, and fire insurance is still older, but the great advance in insurance of all kinds has taken place within the memory of middle-aged people. Look at the slot machine, now, where you drop a dime, and receive your policy. And some daily papers pay a stated sum to the heirs of any one who is killed with a copy of their paper of the same date in their pocket, or to him if he is injured. Even boilers and plate-glass windows are insured against accident. An employer may insure himself against his clerks running away with funds. A merchant can get a policy covering loss from bad debts. You can insure yourself against burglary, and I do not know what not. But let us exercise our judgment, and make use of what is really valuable and wise and prudent for us, and say to the rest, Go thy way.

There is one line of insurance I hope to see extended—that is insurance to take the place of indorsing, or of going on one's bond. There is no justice or right or sense in asking a man to sign your bond or indorse your note. You take all the risk, when you do this, and have nothing to gain, and nothing to say about his management of business. It is easy to put your name down, and hard to say No to a friend; but how many men have been ruined by just such work! The writer was under a cloud for years from just such a transaction. But for many years, now, I have quit it, and quit forever. I will lend a friend money, if I can spare it, to help him, if my wife and I think best; but never my name, which may call for what I have not got. No, I would not go on your bond for Treasurer of the County, so don't ask me. The practice is all wrong. But how are men to get positions without their friends back them? Let them pay for the backing what a safe company can afford to take the risk for. Far better for the County or State to take the risk on its officers who handle funds than for half a dozen individuals who have no interest in the matter to do it. The loss, then, if any, would be shared by all the taxpayers, who are the ones to take the risk, as they are all interested. I said to the last man who came to me with a bond to sign: "If the great State of Ohio cannot trust you, or take the risk of letting you handle her funds, don't ask me, a single individual, to whom a loss of a thousand dollars would be severely felt." I do not believe this is going back on friends, either. It is right. Common practice has been wrong. It looks as though most risk of this kind in the near future would be assumed by large companies. Meanwhile, I will not "go security" for any one, or ask them to do it for me. And I stood on the same platform when much poorer than now, too, and I got along without any indorser, but not quite soon enough to avoid some loss and much worry.

# CHAPTER XL.

## BUYING AT WHOLESALE.

THIS chapter, like the one on Insurance, is the substance of an old institute lecture, and much of it has been published in our report of Ohio institutes. But it will be found to be revised and corrected somewhat. By the way, my views on this subject were never called for much. The officers were often afraid to have it discussed, for fear it would displease some town people that were in to our meetings, but if you are to hear of "Our Farming," buying at wholesale has had quite a little to do with our success. No sensible business man in town can object to my doing my own business as far as I reasonably can. There is no good reason why I should employ someone to do for me what I can as well as not do for myself, and pay them a round price for their labor. But let us consider the subject in detail before commenting further.

Probably nine farmers out of ten buy their groceries and other articles they need at retail. They go to the store and get a little at a time of this, that and the other thing. There are several reasons for this. First, custom. Their fathers did so and they have followed in their tracks. It is rather hard for a born farmer to get out of any beaten track. Perhaps I should not if I had been born on the farm, and had not had a little business education in town. Second, lack of ready money. It takes more money at a time to buy by the quantity, and it takes cash, usually. Many farmers are in the habit of getting trusted, more or less. You cannot do much in this line without the cash to pay down. I would manage to have it in some way. Of course, there are times when this is almost impossible. I have seen such times. And still we paid cash down for years, when we were in debt and paying interest, when much was to be saved by it. It was cheaper to borrow money at 6 or 8 per cent. and pay cash at wholesale, than to pay 25 or 50 per cent. more for articles needed in a smaller way, or on time. Third, natural closeness is a reason why farmers do not buy more at wholesale. Their money comes hard, and it would be hard work for them often to buy, say, a box of soap at a time, instead of two or three bars. A reliable merchant told me that farmers, who were abundantly able to and ought to buy their nails by the keg, would stand in his store and hesitate for some minutes over whether they had better buy two pounds of nails or three, and he had even known them, after deciding to take three, to remark: "How many pounds did I tell you to put in there?" "Three." "Well, I guess you may take one out. I believe I can get along with two." Now these are extreme cases, although true ones; but they illustrate how loth farmers are to part with their hard-earned money, and it is one of the reasons why, as a class, they buy things they must have in driblets, instead of by the quantity. Hence, we find them often buying a half-pound of tea, a dollar's worth of sugar, a paper of saleratus, a lamp chimney, etc., even when they have plenty of money. Then it is a well-known fact, that 300 pounds of sugar, for example, will last much longer if you bring home ten pounds, or a dollar's worth at once, than it would if you got a barrel with that amount in and put in the cellar. The reason is plain. The cook will use the sugar with a less liberal hand when she gets almost out, and, perhaps, go without for a day or two when it is all gone, until someone can go to town. Such a putting on of the brakes twenty or thirty times in a year, will make quite a difference in the amount used, particularly with the tea, coffee, sugar, spices and other groceries. I am not drawing on the imagination for this. Plenty of men, and not all farmers, have told me that this was the case (I do not doubt it), and even boasted that they bought in driblets, because it was economy to do so for this reason. I was trying to show a minister, with a good salary, once, that he could buy his sugar by the barrel, and save some $4 or more then, as I did. And he deliberately told me he could save more buying ten pounds at once, and gave the above reason. Well, if people are so poor that such closeness as this is necessary, I am sorry for them. But even then I believe they are wrong, and that they can buy at wholesale enough cheaper to more than balance the saving from being frequently out of groceries. If they are not so poor as to need to scrimp so, and still are so small as to buy in this way for economy, then I am also sorry for them, and more so for their families. But I believe the great mass of our farmers are not of this class. There are mean, close-fisted men; but such will hardly be reading this book. We do not find such attending our institutes, or reading our papers, or striving to learn the best ways in agriculture. I take it that my friends, whom I am talking with through these pages, want to study out the best ways of doing all our business, and that not one of us would willingly scrimp the wife and daughters in what they need. I take it we are not men who care to save money by getting out of articles of common daily use.

So now let me talk to you of the advantages of buying our supplies, as far as practicable, at wholesale. In the first place, they will cost you far less. Years ago I used to save from $4 to $5 on a barrel of granulated sugar—20 to 25 per cent. interest on a staple article that will not shrink or spoil. Can you use money to any better advantage? Lately, since the price came down, our dealers are making a sort of a run on sugar, and retail it nearly at cost; but I buy by the barrel, all the same; it is so much less trouble, and I make something, too. I avoid buying during the fruit season, when prices are usually higher. My berries will be sweetened this year with four and one-quarter cent granulated sugar. I am in the habit of buying five barrels of flour each fall, after the weather gets cool—twenty sacks—and they are put up in a dry, cool store room, and keep perfectly the year around. There is no question about this, as we have done it for many years. I get this flour at wholesale at a saving of about 20 per cent., usually; five barrels last us a year, and once going to the depot or mill does the job up for a year. I get a couple of sacks of Graham flour at the same time, and at a larger discount, usually. It will keep perfectly, too. We have kept it two years. I buy a barrel of oil at once, and have a galvanized iron tank in the cellar holding sixty gallons. This has a pump in it to pump oil into can for use. When we buy a barrel, we roll it up to cellar window, put pump into bunghole, and in ten minutes have the oil pumped out into tank in the cellar. Have a two-inch tin pipe to lead from pump down to tank. The whole outfit cost less than $7. With this tank there is no evaporation or waste from leakage, and how much do you think we make on the money paid for oil by buying in this way? After sending barrel back it is about 80 per cent. Isn't that a round profit? There is no question about these things. Any one can buy the oil just as cheap as I, unless the freight may be more, and save just as much. Let me give the exact figures. I can buy to-day, and so can you, in Cleveland, a barrel of Eocene oil, a fine oil, far superior to water-white, for seven and one-half cents a gallon. The freight will be twenty-five cents. The barrel returned will take off one and one-half cents from the cost of oil. The net cost to me is about six and one-half cents a gallon. Water-white, a common oil, retails always, I think, at twelve cents, and it is as cheap as they can afford to handle it. So I am ahead five and one-half cents a gallon, and get a better oil, and all at once, with less trouble. This is about the way it is all through. There is a good deal in getting a better class of goods. Now the oil costs me net about $3.25 a barrel of fifty gallons. I save $2.75 over price of common oil. This is over 80 per cent. on the $3.25 invested. See? In years back our merchants have asked eight to ten cents a pound for rice, while I have bought fifty pounds of as good rice as they ever get at five and one-half cents; about 64 per cent. on the amount paid is the profit. With saleratus selling at eight cents, I have bought a dozen papers at five and one-half cents. I used to pay fifteen cents for a quarter pound of Coleman's best English mustard. Then bought a four-pound can (a nice can to keep it in, free) for thirty cents a pound, 100 per cent. interest on my money. Lamp chimneys used to sell here at eight to ten cents each, usually ten cents for one, or three for a quarter. At the same time I bought by the dozen at fifty-five cents, or about four and one-half cents each. At ten cents, I paid more than 100 per cent. profit. Don't they get broken in coming? I lately ordered one dozen No. 1 size, and one dozen No. 2 size, from a wholesale house, and not one was broken. I could give you many more illustrations of the difference in cost between buying at retail and at wholesale, but enough has been said certainly to establish my point, that buying at wholesale is by far the cheaper way.

In the second place, it is the least trouble, as I have hinted above. The fall is the most natural time to lay in supplies, perhaps, and one is most apt to have the money to spare then. I make out a list of groceries and send it to a big wholesale and retail store. They send me the amount it comes to, and I forward my check on bank in Cleveland for the amount. A money order or registered letter would carry it as safely. Then I go to the depot once and bring home a large part of our year's supply and pack it away. My wife does not have to be everlastingly telling me she is out of this thing or that, which is anything but pleasant for her, perhaps. Did you ever think, when you express surprise that your wife has used up all the sugar, or raisins, that it implies that she has been extravagant, and it hurts her feelings, when probably you ate the largest share of the articles yourself? I like this part of the buying by quantity greatly. I always disliked to be everlastingly getting little messes. My time is worth too much. It is too much like the mixed farming I used to do, with its numerous little worries. I do like to feel that a year's supplies, for the most part, are laid in and paid for, and no further trouble. I can gaze on my tank of oil, barrel of sugar, box of Ivory soap, bags of coffee, chest of tea, year's supply of flour, etc., with deep satisfaction every time I go past them. It is very seldom we have to go to town for something we are out of. There are a few things that will not keep good for a year, and not but a few. Raisins, for example, are better fresh. But tea, spices, ginger, mustard, baking powder, etc., can be kept almost any length of time in tight cans. Mason fruit cans are excellent for this purpose. Our coffee we buy in the berry, unburned, because it will keep any length of time, and we know it is pure.

Again, I know that by buying of a large city firm one can get a better class of goods, in many cases. The country or small-town retail dealer does not have a class of customers often that demands the best and are willing to pay for it. We growl much about adulteration, and then go to the store often and buy a cheap article. Cheap, cheap is the great cry, and purity suffers accordingly. A man can get pure goods in almost any line, if he will pay for them. Out State Food Commissioner went into the store where we buy our goods and took samples of every article that is likely to be adulterated, entirely unbeknown to them, buying a little package of each from clerks. When through, he went to the owner and told him what he had done, and that all would be analyzed. The merchant replied: "Go ahead; I am glad of it. I know positively that every article we sell, but one, is pure, as we do our own grinding, etc. There is one that we buy under a written guarantee that it is pure. The machinery to make it is too expensive for us to afford." Well, as he said, *every single article* was pure, except that one. That was adulterated, and the New York firm that furnished it had a bill to settle soon after, and a large one. The same day the Commissioner took samples at another store, and all, except one, were adulterated. I assure you, I stand by the honest firm, and by honest dealing of this kind they have become millionaires, too. It is such goods, friends, that cost me so much less than poorer ones would at retail. Second quality goods may be good enough for country trade, but they do not go down with me. There is a great deal more profit in them, of course. Particularly is this true of little things, which we do not know much about, such as spices and extracts. I can buy a pint bottle of pure extract of lemon, of a city wholesale dealer, much better than what is usually found in little bottles at most country stores, as gold is better than silver, and, what is strange, it will not cost one-half as much, either, that is, per pint. This is no mere talk. We have the pint bottle in the house, and we have bought the cheap (?) ones. Now, I am not going to say anything against country merchants. With the large class of cheap customers they have, like the man who hesitated between two and three pounds of nails, and the amount of losses from trusting out that they have to stand, and competition with city dealers, who sell such an immense quantity that they can sell cheaper—with all these points against them, they have to manage most any way they can. I do not envy them. But I believe the time has come when the business farmer, who pays cash, had better go where his money will bring him the most and the best, and that, if he cannot get cash enough ahead to buy in this way, he had better borrow it at six or eight per cent., instead of paying twenty-five or more by buying in the old way, at retail. Of course, all are not situated so as to buy as handily as the writer; but distance amounts to little. The freight from Philadelphia to my place, on groceries, would not be enough more than from Cleveland to make any difference. In fact, I can buy sugar cheaper in Philadelphia, enough to more than pay the difference in freight.

I am a good deal of a specialist, and do not believe in one man attempting to do everything, but merely writing a letter to order something now and then does not violate this principle very greatly, no more than to go to town and buy it. But there are other things, besides groceries and provisions, that may be bought at wholesale to advantage. A large retail dealer in the city once told me that he could and would sell me a bolt of cotton cloth for less money than our country merchant could buy it for, buying, as he did, by the car load. The staple dry goods can be bought in quantity once a year to advantage. A neighbor wanted some Stark A grain bags, and went to a retail dealer in Akron. He asked twenty-three cents for them, and volunteered the information that they cost twenty-one and one-half cents. Be that as it may, I had a letter from a wholesale firm that day offering me Stark A's at eighteen cents. I sold another neighbor fifty at twenty cents. The Akron merchant better buy of a farmer! But let me tell you, I said too much about this in the papers (to help my farmer friends), and my wholesale man got a flea put in his ear by local dealers, and an order for two hundred bags was returned, and referred to local agent. Well, they made me some bother, but before I slept I had the bags on the way from another city. A farmer can telegraph on a pinch. I use a good many bags to ship my wheat in, and do not propose to pay retail prices, or charge them to my customers. How did I know where to send? Why I simply looked in city paper for wholesale dry goods firms that advertised. By the way, there is much in ordering aright. A short, sharp, business letter, without an extra word, is best. You must not let the farmer foot stick out too much when writing to some firms. I believe I have never had an order returned when the cash was with it. Cash is what they all want. The pushing fellow gets what he wants, if not quite regularly "in the trade." For example: If I want bags, suppose I write: "Send me, by Union Line freight, 2 bales Stark A bags. Enclose New York Exchange $40. Return balance." Although they know nothing about me, the bags will come. I went into a certain factory once and asked for tags. "Right in there we retail them," the floorwalker said. "Not much," I said; "where is your wholesale department?" He looked at me rather suspiciously, but finally said, "Third floor, to the right." Once up there I was all right, and got a thousand for forty cents—what I would have to pay for two hundred at retail. Oh, I must tell you a little fun I had buying paint. I hired a city painter, in the business largely, to paint my house and barn. But I preferred to furnish material. I asked him if he could buy it any cheaper than I could. He said: "Perhaps not. I pay seven cents for lead. If you cannot do as well, I will get it for you." I went to the best store in the city, and said: "Now, I want some paint, lead, oil, colors, etc. What will you sell me two hundred and fifty pounds of the best brand of lead for, cash right in your hand?" "You are just the man I like to see; $6.75," was the answer. I bought what I wanted, and had a good laugh at the painter, that a farmer could beat him buying. Cash did it. But this is not all. When I got through I had fifty pounds lead left. I went to a certain painter, and asked him what he would give me for it. He said, "Just what *I* have to pay." The "I" was emphasized. He wanted me to understand that he could not pay what it cost *me*—a farmer. Well, friends, as truly as I write this, he allowed me seven cents a pound for that lead! I did not say a word, but it is too good to keep longer.

The business farmer of to-day should buy his tools, machinery, seeds, fertilizers, etc., of first hands. There is no reason in the world why he should let an agent simply write a letter and order something for him, and pocket $10 or $20. They cannot do this for me any longer, and they haven't for a long time. Farmers have got into the habit of doing this for two or three reasons: They usually haven't the money, and must buy on time; then they are too afraid of writing a letter. The farmer of the future must have the money and must learn to write business letters. We cannot stand the drain of having other people making money off of us that is so easily made.

I have heard it said that we could not buy of a manufacturer if he had an agent in our vicinity. I beg to say this is usually a mistake, if the farmer has backbone enough. The president of one of our institutes showed me a letter he had just taken from the office that related to this point. He had ordered a quantity of feed from a mill in a neighboring city. They wrote back: "We have an agent in your place; buy of him." The farmer wrote again, short and sharp: "I buy of no agents. If you will send me feed as cheaply as you do to your agent, send it; otherwise, I will look elsewhere." He got the feed. He showed me the letter, which was very polite, and requested him not to mention what he paid for feed.

We were in want of a piano. We wrote to a firm that had agents in this vicinity. One had been to us, trying to make a sale. I wrote to the firm that I would have no dealing with agents, but if they would send me a piano at the same price they furnished it to agents, I would send cash by return mail. I got the piano. Writing that letter saved me $106.25 over best cash price I could get from agents in different parts of State. Competition was too strong to let a cash customer go to a competitor. By the way, I wrote to another firm at the same time, both A No. 1, and their figures were $6 higher only. Of course, this was a strictly private bargain, and I mention no names.

We were in want of a good clock, one that was pretty and a good timekeeper, and would just fit in a certain place, and correspond with furniture. I was long finding it, but one day, when attending the institute at Pomeroy, O., I saw one in the hotel office that just filled the bill. Called on jeweler who sold it, and he wanted $15 for one. Cheap enough, I thought, but did not buy. Saw name of manufacturers inside—Ansonia Clock Co.—and wrote them, giving description and asking what they would send one for, cash with order. They replied: "On receipt of $10.45."

Two short letters and ten cents for a money order saved me $4.55. I could give you plenty of illustrations of this kind, that one can do most anything with the cash. Perhaps you will say: "Oh, yes, *you* can, because people know you, and you may do them some good by way of pay. This might have some show of truth as regards tools, but how about those bags, or that clock or piano, or that paint? Not one of these parties knew me from Adam. I will agree to sign "John Smith" to an order and get what I want. If some manufacturer stands by his agent, one can usually get a similar article of some other make. Now, friends, buying at wholesale will not make you rich, but it saves me certainly $50 a year or more in hard cash, and it takes less work to earn that $50 than any other I get; in fact, the work is not worth mentioning. It would be more work for some of you, for a time, perhaps; but you can learn. There are mammoth cash stores in our large cities, that sell good goods on a very small margin of profit. They have customers scattered all over the country. Cheap postage and low express and freight rates, and the ease and safety with which money can be sent now, make this feasible: This is the way the great cash business of the world is to be done, deplore it as you may. The farmer has as good a right to what can be saved in this way as any one else.

Some object that this is sending the money out of one's own town. Are you sure? Some things are not what they seem. You buy a barrel of sugar in some little town of your grocer. He sends $15 to Philadelphia for it. He charges you, say, when you buy a little at a time, $20 for it. He puts $5 in his pocket. All right. That is keeping the money in town, isn't it? But suppose you had sent the $15 to Philadelphia, and kept the $5 in your pocket, wouldn't there be just as much money left in town? There would be only this difference: In the one case the money would be in the other fellow's pocket, and in the other in yours. Haven't you been growling, many of you, greatly because the other fellow—the middleman—was getting so much more in his pocket than you? Whose fault is it? Can you blame a man for taking what you throw right in his way? Wouldn't you do it? Do your own business more. Your town will not suffer in the aggregate by it. Nor is it contrary to the golden rule. No business man would dream of hiring you to do work for him that he could as well do himself. Be more of a business man. Don't any longer exchange eggs and butter, that your wife very likely had to overwork to make, at a starvation price for second-class groceries, that someone makes from 25 to 100 per cent. on, and then complain that farming doesn't pay. Wake up and make it pay. This is only one little way out of many, wherein we can do better. Don't get discouraged if you make mistakes at first. I have got cheated two or three times myself.

Now, don't say this isn't for you. I have quite a little hard cash that has come in this way. I preach to you just exactly what I practice. Many of you, at least, can gain some in this direction. You haven't the money? Get a little some way to make a start, and then keep up. It takes no more to pay down than a year after; not as much, and if you are responsible you have got to pay sometime, anyway. Sell a cow, go without a new carriage, to get a start, and soon you will be able to buy the cow back, or get the carriage, and still go right on making a nice little sum every year. One of the great needs of our farmers is more working capital. They are so often too hard up to take advantage of any money-making plan like this. As long as they cannot take such advantages, they must expect to remain somewhat short. Profit comes from the best efforts in a businesslike way. Sell off a piece of land, if you can if you have 100 or 200 acres, and get capital to do something with.

Do you say your dealers would not buy of you if you did not of them? Oh, pshaw! Have a number one article, and it will sell. Must you buy of them because they do of you? Would they pay you one cent more for a thing than they could get it for elsewhere? Why should you? They buy from you because it is an object for them to do so in some way. Business is business.

# CHAPTER XLI.

## INDUCEMENTS OFFERED BY FARMING.

THIS chapter is particularly for young men, who may be in doubt as to whether they had better stay on the farm, or make farming their life occupation, or go into town and try to make a home there. It is written from experience in both directions, and particularly for the bright, intelligent, wideawake young man. First, my young friends, there is no chance whatever to become a millionaire on the farm. There is no chance to acquire great wealth. If that is your ambition, and that end must be attained, leave the farm. There is little chance of you ever becoming worth even $50,000, unless you make perfect slaves of your family and yourself. But the accumulation of money or property to leave when you die is a very poor end to work for. If you live well and have a reasonably good time, as you go through life, you will do pretty well if you have $10,000 worth of property left for your last days. Now, right here you may ask a very natural question, viz., Why is it that farmers are so much poorer paid, or, perhaps, better, have no chance of acquiring great wealth? The answer is simply this: Farming is of necessity a small business. It cannot be extended and spread out, as a rule, until hundreds of men and many thousands of capital are employed. Once, when I was at Beloit, Wisconsin, the great windmill firm there showed me the little old shop, not as large as my tool house, in which they began making windmills. Little by little, they increased their business until acres of floor space are occupied, and a small army of men employed. This is practicable in manufacturing, merchandising, etc. It is not on the farm. I went into a large store the other day, where there were hundreds of clerks employed. Order and system reign. A manager or floorwalker on each floor had his eye on every man. All this is entirely possible and practicable in these lines of business, and hence there are chances for men of push to work up and honestly become very wealthy. The farmer has not the same chance. The man who owns a hundred-acre farm, and runs it with the aid of one man, if he buys another hundred acres and employs more help with the expectation of making twice as much, will usually fail. He certainly will if he carries the matter much further.

The ideal farm, to my mind, is a small one, run by the owner and one or two men, if he hasn't sons. But the chances for making much money from so little labor are, of course, small. And it does not seem right to me to blame the wealthy men because they are making so much. This little clipping from the *New York Herald*, expresses a great fact in few words: "A man who hires another at $60 a month to do work which brings in only $61 a month, is a philanthropist. But if he hires twenty thousand men at the same rate, he has an income of $20,000 a month, and is a 'blasted monopolist.'"

My friend, S. H. Todd, says: "We must do a thing ourselves, or have our shadow fall on the man who does it, if we want to succeed." It would be impossible to keep one's shadow all over a big farm. When men are brought close together and systematically arranged in factory or store, it can be done. A man who was a slaveholder before the war, told me lately that he had a very large plantation left him by his father. All these years his wife and he, he said, had worked hard in their efforts to keep the plantation together and hold their own. They had been perfect slaves. He had sixteen tenant families to support and worry over, and he says: "Now, there ought to have been all these years sixteen separate farms, each owned by its occupant." If you can be satisfied with a small business, that can be made to bring a good living, and, eventually, a moderate independence, if you are economical, then you may go to farming. It can be made to pay better, in proportion to the capital invested, than many large factories pay. What chance is there now to make money in the manufucturing business, with a capital of $4,000 or $5,000 and one or two men to help you? I hope I may have made this point plain. Now, there are advantages connected with farming. It is a healthful pursuit, as well as entirely honorable. You can work in pure air and sunshine; you always have work; no one can turn you off; you are your own boss; you are reasonably independent. Said a merchant to me once, after smilingly bowing out a customer: "I just hate myself. Here I must stand and take any insult and smile, when I want to kick the party out doors." Again, one can be at home with his family very much more on the farm, and he is not as much tied up as the merchant or banker. One must tend to business, but he can have much more leisure on a well-managed farm than most successful business men in the city have. There is not that great strife and rush to get ahead that there is in the city, and you can have nearly all that is of real value in city life. All do not, I know; few do, perhaps; but you can. I staid a day or two, lately, with a friend living in the suburbs of a large city. This point was particularly noticed while I was there: A young farmer could hardly expect to ever get so extravagant a house, but he could have the beautiful grounds, lawn, trees, shrubs, flowers, etc. He could have his house as comfortably warmed and as brightly lighted. He could not have the gas, but he could have as much light at one-twelfth the cost. Every real comfort and convenience that I saw in that refined home of wealthy people, a young farmer may get in his country home, and more. They did not have my earth closet or fruit garden, not by considerable. How many times have you heard farmers objecting to improvements, because they could not sell out and get their money back? Don't you worry about this. Select a good farm, in a good locality, and, as fast as you can, pay as you go, improve it. You don't want to sell out. I could not probably sell my farm for any more than the buildings cost, but what do I care. It is my home for life. There are two things, in particular, that my town friend had that I miss—street cars and good roads. We may never have the former; we must work until we get the latter. It will greatly help country life.

On the farm we can have pure water; the farmer can control this. In town he cannot, oftentimes, and this is not a small matter. When I am traveling, winters, I always carry a lot of oranges with me, as in many places I find the water entirely unfit to drink. After speaking, I am thirsty and go to my room and eat an orange or two, if I am afraid of the water. At meal time I get along with the boiled water—tea and coffee. But I do not drink these at home. The water is no safer at many farm homes, but it might be; the farmer *can* control it. I know our water is pure, with no slop drains or other accumulations of filth on the place, except manure in yard or stable, which cannot leach down, as there is a cement floor under the one and a roof over the other. These, with our earth closets, etc., give us pure water. Did you ever notice how little appetite city people usually have? They certainly do not enjoy their meals like a farmer, who has been at work in the sun and pure air. Nor do I believe they sleep as soundly and sweetly, as a rule.

One reason farmers fail to see any profit in their business is because they do not consider how much less it costs to live on the farm than in town, nor how much the farm furnishes them that people in town have to pay money for. I believe I said in another chapter that I would tell you, before I got through, something about why we thought we could not afford to go to the city and live on a salary of something over $2,000 a year, and leave our little farm. Well, it comes right in naturally now. Wife and I talked it over and inquired cost of living in the city. We found that a house as good as we had on the farm would cost us, in any nice part of the city, some $400 a year, and then not have anything approaching as nice grounds as we have. We could not buy the fruit that our fruit garden furnishes for $150, and then it would not be as nice and fresh. It would cost us, say, $60 to keep a cow, which is nothing here. Gas would cost as much for a month as oil costs for a year. Water costs us nothing on the farm. It would not cost much less than $100 to keep a horse in the city, I think. If you do not keep one, livery bills and street cars eat up money pretty fast. You can have your own vegetables on the farm, and often your meat, largely, fuel, etc., etc. Your clothes cost much less. Taxes are less than half. We made up our minds that, take it all around, $1,000 a year on our farm was as good as $2,000 in a large city. The farmer misses the lectures, concerts, contact with the world, etc., that can be got in the city, but one can well afford to pay his fare in occasionally to something of this sort, if he lives within reasonable distance. We need more granges, farmers' clubs, etc., in the country. Young farmers should look out for this. One who goes around much cannot help but see that communities where such exist are ahead of the average. Contact with each other is good for us.

I have read that there were only 13,000 people in New York City who own their own homes. I had rather own a farm home, and make less, than be a tenant in a city for life. Even if I went at something else to earn the first $1,000 or $2,000, as, perhaps, may often be wisest, I would invest it in good land and make that my life business. This, after trying it twenty-three years, and having a hard pull to get started, too.

I would not try to keep all young men on the farm. If you have decided tastes in other directions, you had better, perhaps, follow them. Nor would I have you understand that most farmers live as nicely, and are as comfortable fixed, as I have been talking about. I am sorry, but I fear they do not. But I believe you can do this, my intelligent young friend, and in time make yourself just as nice a home as I have pictured, and live a quiet, peaceful life, with a very fair share of the real comforts and luxuries that it is given us mortals to have. I believe you can do it, and help yourself and help up agriculture a little by your example. It will not be easy, but the greater the obstacles overcome, the sweeter the victory, and the stronger the man. You will not find it easy to get a home of your own, and a business where you can be your own boss in town or city.

All this to the young men, and not a word to the young ladies! Well, to them I say, that I do not believe you can do better than go in partnership with wideawake, up-to-the-times young farmers, on the platform given in Chapter XXXVIII. Are you a little bashful, young men, and hardly know how to get a partner? Let me tell you of a little incident. Some years ago, a young man and his best girl sat before me at an institute when I was talking on the wife's share. I gave them about the same platform as you will find in this book. The young man, I suppose, had hardly mustered up courage before to propose, or had not known just how to go about it. But my talk gave him a hint. On his way home with his girl, he asked her how she liked my ideas, and she said she thought them just right. Then he added, "Will you go into partnership with me on those terms?" She said Yes, very sweetly, I suspect. At any rate, I have since been in their model little farm home, where they told me this story, and said they had never yet regretted that they started on the platform of equal rights.

## CHAPTER XLII.

### SHORT SERMON.

IN conclusion, friends, I want to give you a little agricultural sermon. I will take my text from the Bible, too, in a regular, orthodox manner. Here you have it: "We ought to give the more earnest heed to the things which we have heard."

Now, in this little book which this chapter closes, I am well aware that there is not much that is new. Some of my readers have heard, or read, or thought, of everything, perhaps, that may be found in these pages. A few may get some new ideas, but to most it will simply be a reminder of what they knew before. Therefore, it seems to me, that what most of us really need is to put in practice what we already know—to give more earnest heed to the things which we have heard. We do not do as well as we know how, not by a good deal.

Let us look over some of the points brought out in this book. Every reader knows the value of manure, to start with. It is plant food. A very little of it may make a big ear of corn, instead of a nubbin. Which is worth the most? Or it may make three tons of hay to the acre, instead of one. It will pay for this reason to take care of it, the liquid as well as the solid. The former is worth as much as the latter. Still thousands and thousands of dollars' worth will leak through the cracks of stable floors this winter, or soak into the earth about the barns. Other thousands will be scattered along lanes or in fence corners or out of the way places, where cattle, that should have been enclosed in a yard or stable, have stood. Many a pile will have much of its value washed out by rains, or carried into the air by excessive heating. Things go to waste so easily. All this has been thoroughly considered in this little book, and, doubtless, you knew about it before.. But have you done it? That is the question. If not, then my text hits you. You know, but do not do as well as you know. You need to give more earnest heed to these things you have heard.

You have all heard, and you know it is true, that you cannot afford to raise two crops on the same land at once—a crop of weeds along with a crop of corn, potatoes, wheat or clover; but, alas! how many fields one sees, in the best farming districts, where the weeds are robbing the crops more than it is profitable to allow them to! I wish I could go through a township and just be able to put the exact figures on each farm for the damage done by weeds in a year. Nearly all owners would, doubtless, be greatly surprised. We are used to having weeds around, more or less, and we do not realize the damage they do. There is only a certain amount of plant food available each year, just so many pounds and no more, and every ounce used up by weeds is lost to the crop for that season. Weeds should not, as a rule, be allowed to ever get beyond the seed leaf in our hoed crops. Our grain fields should be clean, and our grass and clover. Of course, we cannot keep every single weed down, but we can, by long-continued systematic effort, prevent all loss, practically; and the cost is small in comparison with the profit, with the tools we have now. A man can sprout the seeds when he is preparing his land for winter wheat, and then kill the young plants. He can thus keep his wheat clean until it and the sown grass and clover occupy the land. He can mow the stubbles and prevent weeds going to seed almost entirely, and let the grass and clover have the plant food. He can have from one to two tons (dry weight) of clover on a new seeded piece in the fall, or the same or more of rag weed, or other foul stuff, just as he pleases. This isn't new at all; it is an old, old story; but how very few there are who really have clean farms! Perhaps I notice this more than some, because I have been trying, without a let-up, for many years, to prevent weeds from doing me any injury. Some seven years ago, after speaking on this subject at an institute, an old gentleman jumped up very quickly, after I sat down, and said: "This is true, every word of it, that we have heard, but I never thought much about it before. I paid my taxes to-day," he added, "and I growled a good deal about having to pay so much. But I have been thinking, during the last few minutes, that I paid a larger tax to the pesky weeds last season, and never growled a bit. Now, gentlemen, you may laugh at me if I pay much more of this sort of tax." And he sat down, while the house resounded with cheers. It would seem as though enough had been said on this point, in different parts of this book, to fully place the matter before you. Are you going to do like the old gentleman? If not, what you need most certainly is to give more earnest heed to what you have heard.

Much has been said about underdraining in this book. It is not new; you have heard it before. Thousands of acres of potatoes, corn, oats and wheat were ruined or seriously injured in this section this excessively wet season of 1892. Thorough tile drainage would have prevented most of the loss. I once noticed two pieces of wheat put in in this town, side by side, on almost flat clay land. One contained sixteen acres, and the other twelve. The land was alike and good. But one piece was tile-drained, and the other was not. The wheat was all put in about the same time. The piece not drained looked rather the best in the fall, but both made a fine growth and promised a large crop.

I watched the result with more than usual curiosity, as the owner of the undrained piece had tried to get me to put it in on shares. I did not care to risk it. The winter and spring were unfavorable for wheat on undrained clay land. The tile-drained piece yielded thirty-five bushels per acre of No. 1 wheat. The undrained piece brought ten bushels per acre of poor wheat. That tile draining, which need not cost more than $30 per acre, brought that year twenty-five bushels of wheat per acre. I notice this fall that they again have wheat in those two fields. The undrained field is plowed in lands and thus partially surface-drained. This may help it a little, but a good deal is left to luck. Now, I am not particularly urging the underdraining of all heavy soil; it may often be as well to keep such in grass for stock, and not drain; but if you are intending to raise crops that are always injured by over much moisture in the soil, on such land, why then there is but one right thing to do. You know it just as well as I, and if you don't do it, you need to give more earnest heed to what you read in Chapters IX. and X. You may read them and say, "Yes, that is sound," from now to the end of time, but no good will come unless you put into practice what you have learned.

Did I stir you up any on tillage in Chapters XIII. and XIV.? Did you think, "Now I never will put in another crop except on thoroughly prepared soil? I will make my wheat land fine and firm enough to suit Terry after this. I will think, when I am working my crops so much, that I am helping future crops as well as present ones. That earth mulch business is sensible, and I will never let a crust form and stay long on any corn or potato field after this." Well, that is all good, but of itself it does not amount to shucks. The question of importance is whether you will really carry this out, whether you will put the knowledge into practice. If you do not, then our text comes to you with the words: "We ought to give more earnest heed to the things we have heard."

If you haven't time to fit the land properly and thoroughly, and tend to the tillage just when it should be done, why Chapter VI. tells you how we found time to do all work thoroughly well by not undertaking any more than we could reasonably expect to accomplish. It has been well rubbed in in this book that half-way work no longer pays, that average crops are not any longer a source of profit. How on earth can you expect to make anything if you can only half prepare your seed beds; have to till your crops when you can, instead of just when they need it; are so driven that you cannot cut your clover hay until it has lost about half its value, and so on? Oh, don't worry along, year after year, trying to do a little of everything, with your work driving you to death, and often necessarily slighted, as you are managing, and all this just because your father did so. Why, bless you, your father, or grandfather, used to ride in a stage coach, or canal boat, but you ride on the cars. Can you not advance a little in farm methods, as well? No narrow specialty farming has been preached in these pages, but a sensible kind that gives one the best chance to do something. If you are prejudiced on this point, and do not study over it carefully and get all there is in it for you as you are situated, you are not giving earnest heed to the things you have heard. It is quite useless to read, or hear, unless we will do this. If we are simply going to take in what our present practice agrees with, what possible use is it to know of anything different?

Do you plow around any cat swamps? Does any undrained swale cross a cultivated field? Are your lots in a shape that is not the best for fast tillage? Are there any large stones that you could sink, or small ones that should be picked up? Are your fields cleared of every obstruction to fast work with costly implements? If you see you are not doing your best on any of these points, the advantages of which have been fully placed before you in these pages, and which you probably knew before, then our text bears down on you with its sound advice: We ought to give more earnest heed to the things we have heard.

How are you on the clover question? Do you sow timothy seed because it is cheaper? Do you not know that there is a good deal of solid truth in Chapter XV.? Have you failed to get satisfactory results from clover growing? Did you treat the clover as Chapter XVI. tells about? After the surface soil has become exhausted somewhat of its original fertility, is there any practical way on earth to bring it up any cheaper than clover growing in regular rotation—of course, along with draining, manure saving, good tillage, etc.? You can draw on the subsoil and the air, and leave the fertility in the soil, and you can grow a fine crop of the best of hay, while you are doing it—no loss of the use of the land. Certain it is that a great many farmers need to give more earnest heed to what is now well known about the benefits of clover growing.

Do you plant little potatoes every year? Do you use wheat for seed that is not entirely clean, and selected from the best of the field? Do you sow clover seed by hand and spread manure by hand, when a machine will do both very much faster and better? Do you let your tools and wagons wear out as fast again as they need to, from unnecessary exposure when not in actual use? Do you go to market with less than what your horses can easily draw, because your wagon is not arranged to carry a good load handily? Then kindly give earnest heed to what has been said on these points.

Are you working for a home, and comfort for your loved ones? Have you got the strawberries and small fruits? Have you made your wife your partner in truth, and does she never have to ask you for a little change when she wants any? Are you properly insured? Do you buy for cash and by the quantity, as far as practicable? If not, what is the trouble? Am I wrong in advising such things, or are you not giving earnest heed to them?

But enough. I do not want to tire you all out. I once heard my friend John Gould, tell of asking a farmer to subscribe for an agricultural paper, "No, I thank you," says the farmer. "I know a mighty sight better than I do now, and I don't care to have it rubbed in every week." I have "rubbed in" this matter enough. But read over this chapter oftener than you do the rest of the book, because we all do know better than we do.

Now, I know very well that times are rather hard, prices low, and many farmers quite discouraged, but friends, try practicing better the best you know. It is of little use to change from one business to another. Stick where you are, but just do your best to improve in every possible way. Get better stock. Take better care of them. Get better seed. Prepare the ground better. Study your business more. Work on in this line. Success must come, or at least you can make it come. But, to do this, you must push and pull with vim and grit, not stand back and say there is no chance. I remember reading, once, something like the following: A crowded street car goes by. You try to get on and the crowd says there is no more room. But you grab hold with one hand and get one foot on, and on they go. After a little the crowd gives and you get both feet on the step. Soon you are on the platform. One after another drops off, and then you can get standing room inside. At the next stop you get a seat. This is success and the way it is won. May I give you this little motto at parting: Hereafter I will *do* the very best I know or can learn how.

In conclusion, allow me to say that my work on this book is hardly satisfactory to myself. If I could have had a year of absolute freedom from all other work, I know I could have done better. But this was not possible. While writing this I have been constantly called off to see to my own farming. I have done my usual work on the farm—what I thought I could do a little better than I could hire it done. Visitors have often interrupted me just as I got to writing. Weekly articles have been written for *The Practical Farmer*, and many private letters answered. It has been necessary to work this job in between as best I could. And, of course, you can see that it would be utterly impossible for me to carry in my head all that was written under the above circumstances. So if you find something repeated, or not quite clear, you must be kind enough to overlook the blunder.

There are a good many figures in this book. The writer has been over them and over them again, but still it will be almost too much to hope that no mistake may be found.

Hoping you all may take *The Practical Farmer*, of Philadelphia, Pa., for which I write every week, so I can gently "rub in," from time to time, the practices that are the most businesslike, and wishing you all a large share of true success,

I am your friend.

T. B. Terry.

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